Special Flood Hazard Evaluation Report

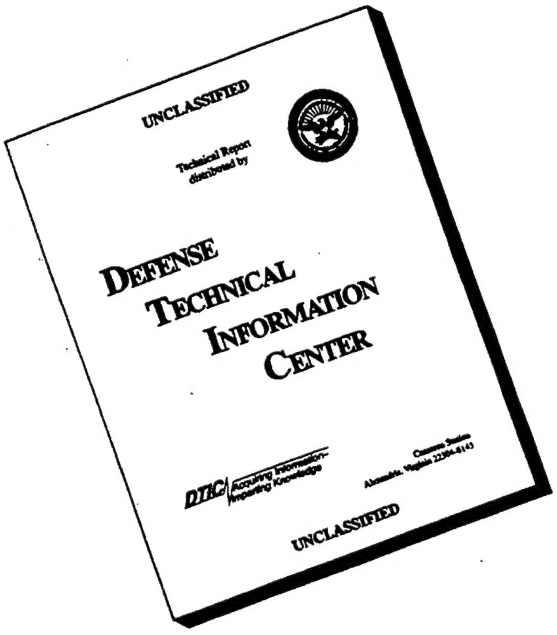
Red Creek and Red Mill Creek
Village of Perry, Lake County, Ohio

Prepared for the
Ohio Department of Natural Resources

US Army Corps
of Engineers
Buffalo District

November 1995

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* Special Flood Hazard Evaluation Report, Red Creek and Red Mill Creek, Village of Perry, Lake County, Ohio.		5. TYPE OF REPORT & PERIOD COVERED Final 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Engineer District, Buffalo 1776 Niagara Street Buffalo, N.Y. 14207-3199		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE 1995 13. NUMBER OF PAGES 21
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*		15. SECURITY CLASS. *(of this report)* Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*
Flood Control
Flood Plain Management
Red Mill Creek

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*
This technical report documents the result of an investigation to determine the potential flood situation along Red Creek and Red Mill Creek, within the Village of Perry, Lake County, Ohio. The study reaches include Red Creek from the Conrail embankment upstream of Park Road, upstream to the railroad embankment in the Village of Perry. Red Mill Creek was studied from the Village of Perry north corporate boundary, upstream to Narrows Road.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

SPECIAL FLOOD HAZARD EVALUATION REPORT
RED CREEK AND RED MILL CREEK
VILLAGE OF PERRY, LAKE COUNTY, OHIO

TABLE OF CONTENTS

TABLES

FIGURES

PLATES

MAPS

SPECIAL FLOOD HAZARD EVALUATION REPORT
RED CREEK AND RED MILL CREEK
VILLAGE OF PERRY, LAKE COUNTY, OHIO

INTRODUCTION

This Special Flood Hazard Evaluation Report documents the results of an investigation to determine the potential flood situation along Red Creek and Red Mill Creek within the Village of Perry, Lake County, Ohio. This study was conducted at the request of the Ohio Department of Natural Resources under the authority of Section 206 of the 1960 Flood Control Act, as amended. The study reaches include Red Creek from the Conrail embankment upstream of Park Road, upstream to the railroad embankment in the Village of Perry. Red Mill Creek was studied from the Village of Perry north corporate boundary, upstream to Narrows Road.

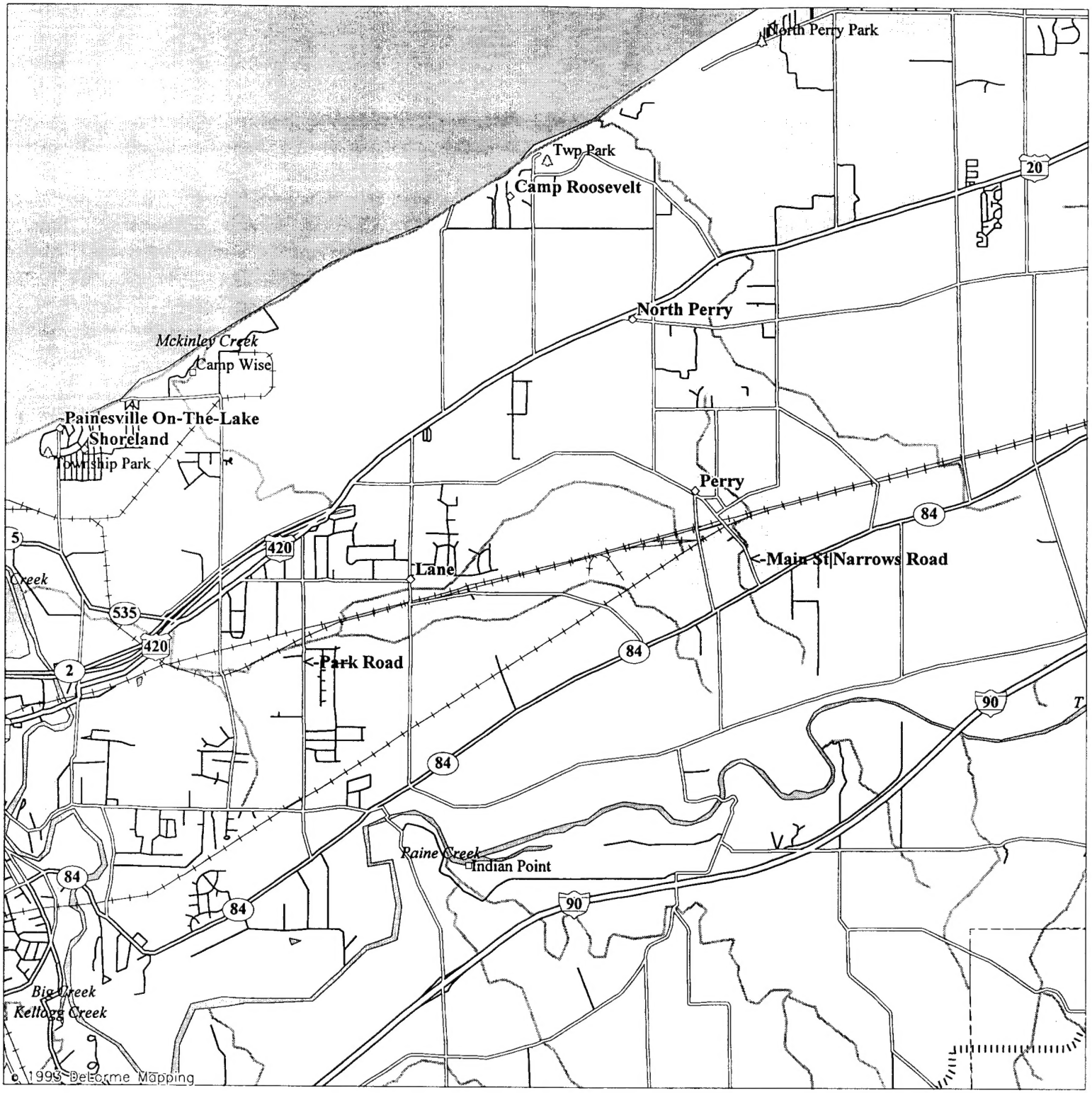
The Village of Perry is located in Lake County in northeastern Ohio, east of the city of Cleveland. The county is bordered on the north by Lake Erie, on the east by Ashtabula County, on the south by Geauga County, and on the west by Cuyahoga County, Ohio. The Lake County population is 215,499 according to the 1990 census and the Village of Perry population is 1,012 (Reference 1).

The climate of Perry is classified as continental with short periods of extreme cold and heat, modified by the close proximity of Lake Erie. Red Creek originates in the town of Perry and flows westerly to the Grand River near Painesville. Red Mill Creek originates in the town of Perry and flows north to Lake Erie.

Knowledge of potential floods and flood hazards is important in land use planning. This report identifies the 100-year and 500-year flood plains and 100-year floodway for the reaches studied.

Information developed for this study will be used by local officials to manage future flood plain development. While the report does not provide solutions to flood problems, it does furnish a suitable basis for the adoption of land use controls to guide flood plain development, thereby preventing intensification of the flood loss problem. It will also aid in the development of other flood damage reduction techniques to modify flooding and reduce flood damages which might be embodied in an overall Flood Plain Management (FPM) program. Other types of studies, such as those of environmental attributes and the current and future land use roles of the flood plain as part of its surroundings, would also profit from this information.

Although Flood Insurance Rate Maps have been developed for the community, no detailed analyses was used to study the stream reaches analyzed in this study because the area was thought to have a low development potential at the time the maps were prepared. However, the western portion of the county is now experiencing residential



LEGEND

- Population Center
- State Route
- Town, Small City
- US Highway
- Street, Road
- Hwy Ramps
- Major Street/Road
- State Route
- Interstate Highway
- US Highway
- Railroad
- River
- Open Water

Scale 1:62,500 (at center)

1 Miles

2 KM

Mag 13.00
Wed Sep 06 11:48:56 1995

development pressure, and local officials requested detailed flood plain information to assist them in managing development.

Additional copies of this report can be obtained from the Ohio Department of Natural Resources until its supply is exhausted, and the National Technical Information Service of the U.S. Department of Commerce, Springfield, Virginia 22161, at the cost of reproducing the report. The Buffalo District Corps of Engineers will provide technical assistance and guidance to planning agencies in the interpretation and use of the hydrologic data obtained for this study.

PRINCIPAL FLOOD PROBLEMS

Although flooding may occur during any season, the principal flood problems have occurred during winter and spring months and are usually the result of spring rains and or snowmelt.

Flood Magnitudes and Their Frequencies

Floods are classified on the basis of their frequency or recurrence interval. A 100-year flood is an event with a magnitude that can be expected to be equaled or exceeded once on the average during any 100-year period. It has a 1.0 percent chance of occurring in any given year. It is important to note that, while on a long-term basis, the exceedence averages out to once per 100 years, floods of this magnitude can occur in any given year or even in consecutive years and within any given time interval. For example, there is a greater than 50 percent probability that a 100-year event will occur during a 70-year lifetime. Additionally, a house which is built within the 100-year flood level has about a one-in-four chance of being flooded in a 30-year mortgage life.

Hazards and Damages of Large Floods

The extent of damage caused by any flood depends on the topography of the flooded area, the depth and duration of flooding, the velocity of flow, the rate of rise in water surface elevation, and development of the flood plain. Deep water flowing at a high velocity and carrying floating debris would create conditions hazardous to persons and vehicles which attempt to cross the flood plain. Generally, water 3 or more feet deep which flows at a velocity of 3 or more feet per second could easily sweep an adult off his feet and create definite danger of injury or drowning. As indicated in Table 2, flow velocities of Red Creek and Red Mill Creek exceed 4 feet in the reaches studied. Rapidly rising and swiftly flowing floodwater may trap persons in homes that are ultimately destroyed or in vehicles that are ultimately submerged or floated. Since water lines can be ruptured by deposits of debris and by the force of flood waters, there is the possibility of contaminated domestic water supplies. Damaged sanitary sewer lines and sewage treatment plants could result in the pollution of floodwaters and

could create health hazards. Isolation of areas by floodwater could create hazards in terms of medical, fire, or law enforcement emergencies.

HYDROLOGIC ANALYSES

Hydrologic analyses were carried out to determine the peak discharge-frequency relationships for the flooding sources affecting the community. Hydrology was developed for four reaches on Red Creek and two reaches on Red Mill Creek. For both streams, the peak discharges were initially calculated using the Graphical Peak Discharge Method of the U.S. Soil Conservation Service (Reference 2). Basin characteristics including time of concentration, drainage area, land use and soil type, and percent of watershed consisting of ponds and swamps, were calculated using the Painesville and Perry, Ohio quadrangle maps for Red Creek and the Perry, Painesville, Thompson, and Madison quadrangles for Red Mill Creek (Reference 3). Cross sectional information developed by Buffalo District personnel were also used to develop time of concentration; and soil type was determined by Lake County soil maps. The results of the initial HEC-2 backwater runs for Red Creek and Red Mill Creek indicated that the calculated discharges would have to be adjusted for overbank storage created by restrictive railroad culverts near Park Road for Red Creek and the intersection of Narrows Road and Harper Street for Red Mill Creek. The PC version of HEC-1 was used to determine the impact of storage on the peak discharges (Reference 4).

The annual peak discharges for Red Creek and Red Mill Creek are shown in Table 1.

TABLE 1
SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (sq. mi.)	Peak Discharges 100-Year (cfs)	Peak Discharges 500-Year (cfs)
Red Creek			
Near confluence of unnamed tributary approximately 1500 feet upstream of Bowhall Road	5.5	540	700
Just downstream of unnamed tributary approximately 1400 feet upstream of Park Road	2.5	860/320[1]	1110/350[1]
Just downstream of an unnamed tributary near Maine Avenue	0.95	370	460
7000 feet upstream of railroad embankment	0.23	140	200
Red Mill Creek			
At downstream study limit (Village of Perry corporate limit)	2.2	240	280
Just downstream of the Conrail tracks	1.5	530/160[1]	800/170[1]

[1] inflow to reach, outflow through culvert

HYDRAULIC ANALYSES

Analyses of the hydraulic characteristics of flooding from sources studies were carried out to provide estimates of the elevations of floods for the 100-year and 500-year recurrence intervals.

Cross-section data for the backwater analyses of Red Creek and Red Mill Creek were obtained from field surveys performed by Buffalo District personnel in November 1993. Additional data were obtained from topographic maps (Reference 3). All bridges and culverts were surveyed to determine elevation data and structural geometry. Spot elevations were obtained in the overbank areas in order to accurately delineate the flood plain boundaries.

Water surface elevations of the 100-year and 500-year recurrence interval flood events were computed using the COE HEC-2 step-backwater computer program (Reference 5). The discharges computed for Red Creek were lower at Park Road than those computed for the July 1980 Flood Insurance Study (Reference 6). Therefore, critical depth was used to establish the starting water surface elevation for Red Creek. The slope-area method was used to establish the starting water surface elevation for Red Mill Creek.

Locations of the selected cross-sections used in the hydraulic analyses are shown on the Flood Profiles (Plates 1, 2 and 3) and on the Flooded Areas Maps which accompany this report.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were selected using engineering judgement and were based on field observations of the stream and flood plain areas. The values for Manning's "n" and the contraction and expansion coefficients are shown in Table 2.

TABLE 2
MANNING'S "N" AND CONTRACTION & EXPANSION COEFFICIENTS

Flooding Source	Channel	Overbank	Contraction	Expansion
Red Creek	.015 - .040	.035 - .060	.2 - .3	.4 - .5
Red Mill Creek	.020 - .070	.040 - .080	.2 - .3	.4 - .5

Flood profiles were drawn showing the computed water surface elevations for the selected recurrence intervals. The flood plain boundaries were delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using the topographic maps and spot elevations obtained during the field surveys. Small areas within the flood plain boundaries may be above the flood elevations, but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
A	21,280	209	1,336	0.2	676.6	676.6	676.6	0.0
B	23,300	157	1,144	0.8	684.1	684.1	684.1	0.0
C	24,800	61	175	4.9	685.3	685.3	685.4	0.1
D	26,050	20	77	4.8	690.7	690.7	690.7	0.0
E	27,400	40	198	1.9	695.2	695.2	695.3	0.1
F	31,090	24	81	1.7	696.1	696.1	696.3	0.2
G	33,318	152	178	0.8	696.9	696.9	697.7	0.8
H	35,555	21	46	3.0	698.1	698.1	699.0	0.9

1 Distance is measured in feet from the mouth.

TABLE 3

VILLAGE OF PERRY, OHIO
(Lake County)

FLOODWAY DATA

RED CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
A	865	48	123	2.0	688.7	688.7	689.4	0.7
B	1,700	16	48	5.0	691.6	691.6	691.7	0.1
C	3,090	49	88	1.8	694.9	694.9	695.1	0.2
D	4,164	70	78	2.1	696.4	696.4	696.4	0.0
E	5,245	19	64	2.5	699.6	699.6	699.7	0.1
F	5,870	32	82	1.9	700.9	700.9	700.9	0.0

1 Distance is measured in feet from Village of Perry corporate limits.

TABLE 3

VILLAGE OF PERRY, OHIO
(Lake County)

FLOODWAY DATA

RED MILL CREEK

Floodways were determined for the streams studied in detail. Floodway encroachments were based on equal conveyance reduction from each side of the flood plain, with adjustments as necessary to provide functional and manageable floodways. At the request of the Ohio Department of Natural Resources, the maximum increase in stage due to encroachment was limited to 1 foot, provided that hazardous velocities were not produced. Floodway widths were computed at cross sections and varied from 16 to 70 feet for Red Mill Creek and 21 to 209 feet for Red Creek. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 3.

The computed floodways are also shown on the Flooded Area Maps. In cases where the floodway and the 100-year flood plain boundaries are either close together or collinear, only the floodway boundary is shown. For Red Mill Creek, all area upstream of the Conrail tracks was used as storage in the hydrologic analysis. The area has been shown as floodway to ensure that no encroachment will occur. Any encroachment would increase the discharges resulting in changes to flood plain elevations and floodway widths for the downstream reaches of Red Mill Creek.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profile are considered valid only if hydraulic structures remain unobstructed, operate properly, and do no fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Descriptions of the marks are presented in Table 4.

TABLE 4
ELEVATION REFERENCE MARKS

Reference Mark	Map No.	Elevation (feet NGVD)	Description
Red Mill Creek			
RM-1	Sheet 64	691.02	Chiseled square, marked in yellow, on inside corner of east wingwall at downstream side of Perry Township Public School bridge over Red Mill Creek.
RM-2	Sheet 64	696.79	Chiseled square, marked in yellow, on top of metal guard post at downstream (north) side of Manchester Road bridge over Red Mill Creek.
RM-3	Sheet 64	699.07	PK (nail) in east end of pole #5000/010. Pole is at south end of foot bridge just west (downstream) of Green Street bridge over Red Mill Creek.

RM-4	Sheet 64	701.38	Chiseled square on concrete headwall at upstream side of Harper Street culvert for Red Mill Creek.
RM-5	Sheet 65	712.75	Chiseled square, marked in yellow, on north end of sandstone headwall at upstream side of Main Street (Narrows Road) culvert for Red Mill Creek.
RM-6	Sheet 65	731.40	Chiseled square on east corner of concrete casing around drop inlet, northwest side of Ridge Road, just northeast of ditch.
Red Creek			
RM-7	Sheet 88	689.24	Spike, 1 foot above ground on south side of 4th power pole west of Lane Road, along the south side of Conrail tracks.
RM-8	Sheet 88	693.59	Spike in power pole #844765, located 18 feet east of Lane Road and 30 feet north of Conrail tracks.
RM-9	Sheet 82	687.59	Chiseled square on east corner of headwall at upstream end of Maine Avenue culvert for Red Creek.
RM-10	Sheet 82	691.98	Chiseled square on east side of headwall at upstream end of Givens Court culvert for Red Creek.
RM-11	Sheet 82	693.57	Top of north bonnet bolt of hydrant at north end of Oakbrook Drive.
RM-12	Sheet 82	701.58	Top of southeast anchor bolt of Conrail traffic control light standard, 4,250 feet east of Lane Road.
RM-13	Sheet 65	699.17	Spike, 1.4 feet above ground on south side of pole #148/20. Pole is alongside of Conrail tracks near power lines, 4,020 feet west of Maple Road.
RM-14	Sheet 65	701.65	Spike 1.75 feet above ground on south side of second pole west of culvert for Red Creek. Pole is alongside of Conrail tracks 945 feet west of Maple Road.

UNIFIED FLOOD PLAIN MANAGEMENT

Historically, the alleviation of flood damage has been accomplished almost exclusively by the construction of protective works such as reservoirs, channel improvements, and floodwalls and levees. However, in spite of the billions of dollars that have already been spent for construction of well-designed and efficient flood control works, annual flood damages continue to increase because the number of persons and structures occupying floodprone lands is increasing faster than protective works can be provided.

Recognition of this trend has forced a reassessment of the flood control concept and resulted in the broadened concept of unified flood plain management programs. Legislative and administrative policies frequently cite two approaches: structural and nonstructural, for adjusting to the flood hazard. In this context, "structural" is usually intended to mean adjustments that modify the behavior of floodwaters through the use of measures such as dams and channel work. "Nonstructural" is usually intended to include all other adjustments in the way society acts when occupying or modifying a flood plain (e.g., regulations, floodproofing, insurance, etc.). Both structural and nonstructural tools are used for achieving desired future flood plain conditions. There are three basic strategies which may be applied individually or in combination: (1) modifying the susceptibility to flood damage and disruption, (2) modifying the floods themselves, and (3) modifying (reducing) the adverse impacts of floods on the individual and the community.

Modify Susceptibility to Flood Damage and Disruption

The strategy to modify susceptibility to flood damage and disruption consists of actions to avoid dangerous, economically undesirable, or unwise use of the flood plain. Responsibility for implementing such actions rests largely with the non-Federal sector and primarily at the local level of government.

These actions include restrictions in the mode and the time of occupancy; in the ways and means of access; in the pattern, density, and elevation of structures and in the character of their materials (structural strength, adsorptiveness, solubility, corrodibility); in the shape and type of buildings and in their contents; and in the appurtenant facilities and landscaping of the grounds. The strategy may also necessitate changes in the interdependencies between flood plains and surrounding areas not subject to flooding, especially interdependencies regarding utilities and commerce. Implementing mechanisms for these actions include land use regulations, development and redevelopment policies, floodproofing, disaster preparedness and response plans, and flood forecasting and warning systems.

Different tools may be more suitable for developed or underdeveloped flood plain or for urban or rural areas. The information contained in this report is particularly useful for the preparation of flood plain regulations.

a. Flood Plain Regulations.

Flood plain regulations apply to the full range of ordinances and other means designed to control land use and construction within floodprone areas. The term encompasses zoning ordinances, subdivision regulations, building and housing codes, encroachment line statutes, open area regulations, and other similar methods of management which affect the use and development of floodprone areas.

Flood plain land use management does not prohibit use of floodprone areas; to the contrary, flood plain land use management seeks the best use of flood plain lands. The flooded area maps and the water surface profiles contained in this report can be used to guide development in the flood plain. The elevations shown on the profile should be used to determine flood heights because they are more accurate than the outlines of flooded areas. It is recommended that development in areas susceptible to frequent flooding adhere to the principles expressed in Executive Order 11988 - Flood Plain Management, whose objective is to "... avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of flood plains ... whenever there is a practicable alternative." Accordingly, development in areas susceptible to frequent flooding should consist of construction which has a low damage potential such as parking areas, parks, and golf courses. High value construction such as buildings, should be located outside the flood plain to the fullest extent possible. In instances where no practicable alternative exists, the land should be elevated to minimize damages. If it is uneconomical to elevate the land in these areas, means of floodproofing the structure should be given careful consideration.

b. Development Zones.

A flood plain consists of two zones. The first zone is the designated "floodway" or that cross sectional area required for carrying or discharging the anticipated flood waters with a maximum 1-foot increase in flood level (Ohio Department of Natural Resources standard). Velocities are the greatest and most damaging in the floodway. Regulations essentially maintain the flow-conveying capability of the floodway to minimize inundation of additional adjacent areas. Uses which are acceptable for floodways include parks, parking areas, open spaces, etc.

The second zone of the flood plain is termed the "floodway fringe" or restrictive zone, in which inundation might occur but where depths and velocities are generally low. Although not recommended if practicable alternatives exist, such areas can be developed provided structures are placed high enough or floodproofed to be reasonably free from flood damage during the 100-year flood. Typical relationships between the floodway and floodway fringe are shown in Figure 2. The floodways for Red Creek and Red Mill Creek have been plotted on the Flooded Area Maps.

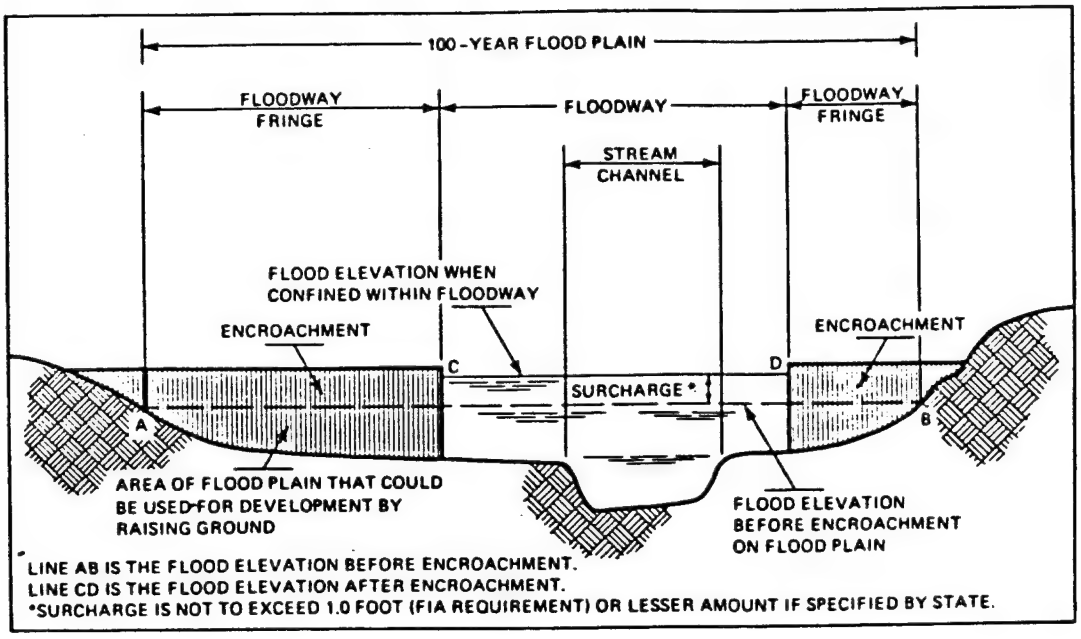


Figure 2 - Floodway Schematic

c. Formulation of Flood Plain Regulations.

Formulation of flood plain regulations in a simplified sense involves selecting the type and degree of control to be exercised for each specific flood plain. In principle, the form of the regulations is not as important as a maintained adequacy of control. The degree of control normally varies with the flood hazard as measured by depth of inundation, velocity of flow, frequency of flooding, and the need for available land. Considerable planning and research is required for the proper formulation of flood plain regulations. Formulation of flood plain regulations may require a lengthy period of time during which development is likely to occur. In such cases, temporary regulations should be adopted and amended later as necessary.

Modify Flooding

The traditional strategy of modifying floods through the construction of dams, dikes, levees and floodwalls, channel alterations, high flow diversions and spillways, and land treatment measures has repeatedly demonstrated its effectiveness for protecting property and saving lives, and it will continue to be a strategy of flood plain management. However, in the future, reliance solely upon a flood modification strategy is neither possible nor desirable. Although the large capital investment required by flood modifying tools has been provided largely by the Federal government, sufficient funds from Federal sources have not been and are not likely to be available to meet all situations for which flood modifying measures would be both effective and

economically feasible. Another consideration is that the cost of maintaining and operating flood control structures falls upon local governments.

Flood modifications acting alone leave a residual flood loss potential and can encourage an unwarranted sense of security leading to inappropriate use of lands in the areas that are directly protected or in adjacent areas. For this reason, measures to modify possible floods should usually be accompanied by measures to modify the susceptibility to flood damage, particularly by land use regulations.

Modify the Impact of Flooding on Individuals and the Community

A third strategy for mitigating flood losses consists of actions designed to assist individuals and communities in their preparatory, survival, and recovery responses to floods. Tools include information dissemination and education, arrangements for spreading the costs of the loss over time, purposeful transfer of some of the individual's loss to the community by reducing taxes in flood prone areas, and the purchase of Federally subsidized flood insurance.

The distinction between a reasonable and unreasonable transfer of costs from the individual to the community can also be regulated and is a key to effective flood plain management.

CONCLUSION

This report presents local flood hazard information for Red Creek and Red Mill Creek in the unincorporated areas of Village of Perry, Ohio. The U.S. Army Corps of Engineers, Buffalo District, will provide interpretation in the application of the data contained in this report, particularly as to its use in developing effective flood plain regulations. Requests should be coordinated with the Ohio Department of Natural Resources.

GLOSSARY

BACKWATER EFFECT	The resulting rise in water surface in a given stream due to a downstream obstruction or high stages in an intersecting stream.
BASE FLOOD	A flood which has an average return interval in the order of once in 100 years, although the flood may occur in any year. It is based on statistical analysis of streamflow records available for the watershed and analysis of rainfall and runoff characteristics in the general region of the watershed. It is commonly referred to as the "100-year flood."
DISCHARGE	The quantity of flow in a stream at any given time, usually measured in cubic feet per second (cfs).
FLOOD	An overflow of lands not normally covered by water. Floods have two essential characteristics: the inundation of land is temporary and the lands are adjacent to and inundated by overflow from a river, stream, ocean, lake, or other body of standing water. Normally a "flood" is considered as any temporary rise in streamflow or stage, but not the ponding of surface water, that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, and rise of groundwater coincident with increased streamflow.
FLOOD CREST	The maximum stage or elevation reached by floodwaters at a given location.
FLOOD FREQUENCY	A statistical expression of the percent chance of exceeding a discharge of a given magnitude in any given year. For example, a 100-year flood has a magnitude expected to be exceeded on the average of once every hundred years. Such a flood has a 1 percent chance of being exceeded in any given year. Often used interchangeably with RECURRENCE INTERVAL.

FLOOD PLAIN	The areas adjoining a river, stream, watercourse, ocean, lake, or other body of standing water that have been or may be covered by floodwater.
FLOOD PROFILE	A graph showing the relationship of water surface elevation to location; the latter generally expressed as distance upstream from a known point along the approximate centerline of a stream of water that flows in an open channel. It is generally drawn to show surface elevation for the rest of a specific flood, but may be prepared for conditions at a given time or stage.
FLOOD STAGE	The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.
FLOODWAY	The channel of a watercourse and those portions of the adjoining flood plain required to provide for the passage of the selected flood (normally the 100-year flood) with an insignificant increase in the flood levels above that of natural conditions. As used in the National Flood Insurance Program, floodways must be large enough to pass the 100-year flood without causing an increase in elevation of more than a specified amount (1 foot in most areas).
RECURRENCE INTERVAL	A statistical expression of the average time between floods exceeding a given magnitude (see FLOOD FREQUENCY).

REFERENCES

1. U.S. Department of Commerce, Bureau of the Census, 1990 Census of the Population and Housing, Washington, D.C.

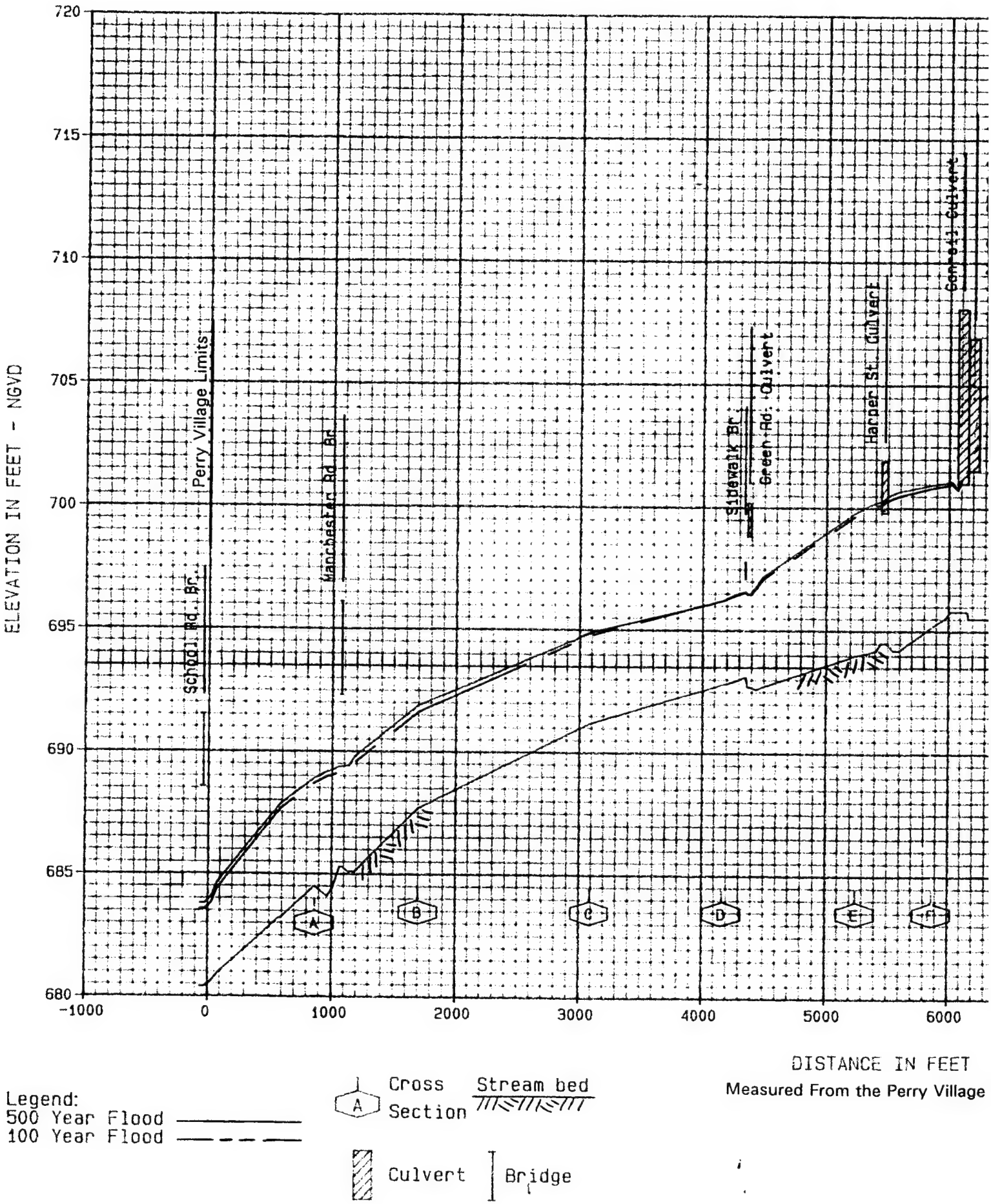
2. U.S. Department of Agriculture, Soil Conservation Service, Technical Release 55 (TR-55) Urban Hydrology for Small Watersheds, Graphical Peak Discharge Method, June 1986.

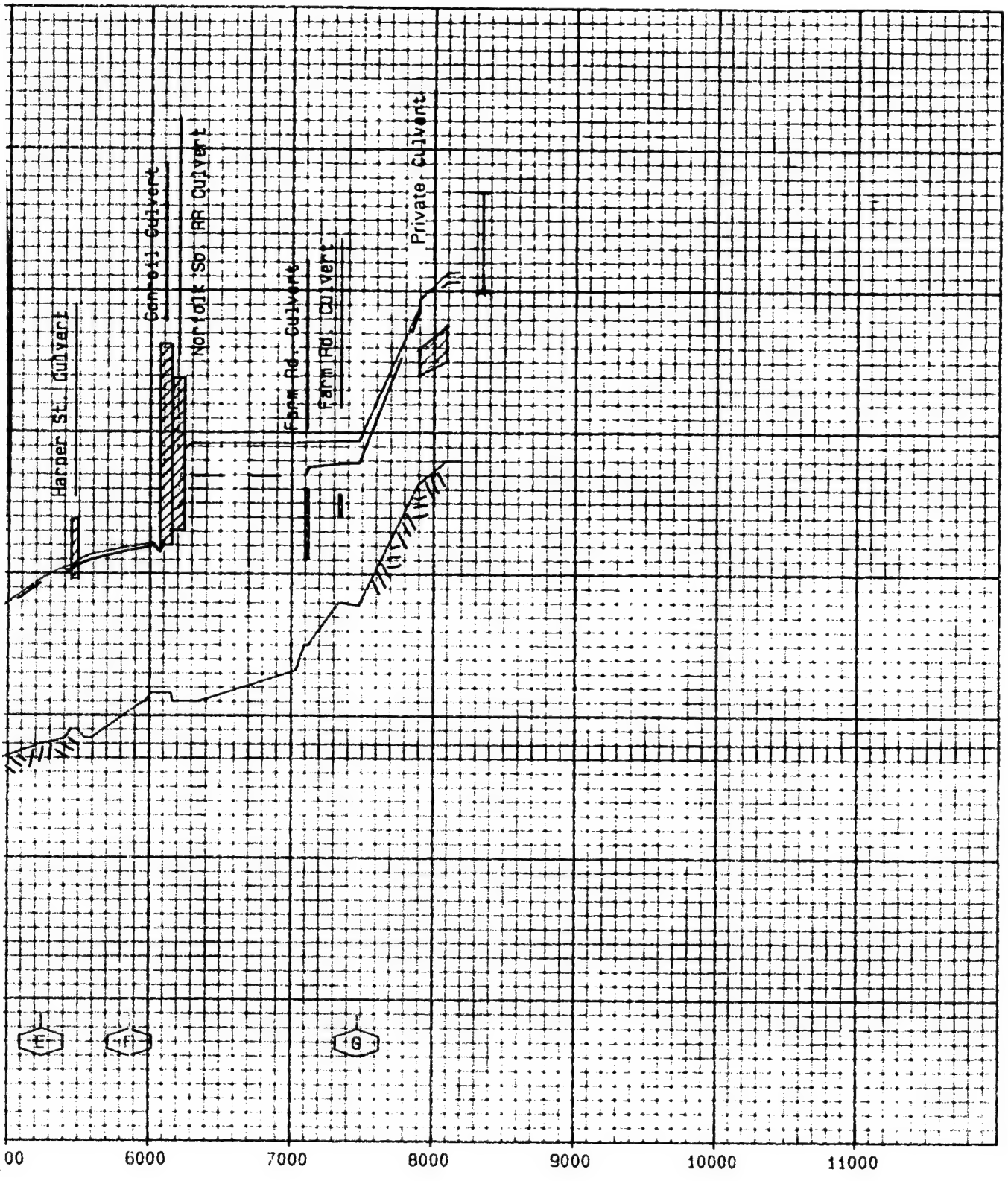
3. U.S. Department of the Interior, Geological Survey, 7.5 Minute Series (Topographic) Maps, Scale 1:24,000, Contour Interval 10 feet: Painesville (photorevised 1985), Perry (photorevised 1979), Thompson (photorevised 1970) and Madison (photorevised 1970).

4. U.S. Army Corps of Engineers, Hydrologic Engineer Center, HEC-1, PC version 4.0, September 1990.

5. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles Generalized Computer Program, Davis, California, 1987.

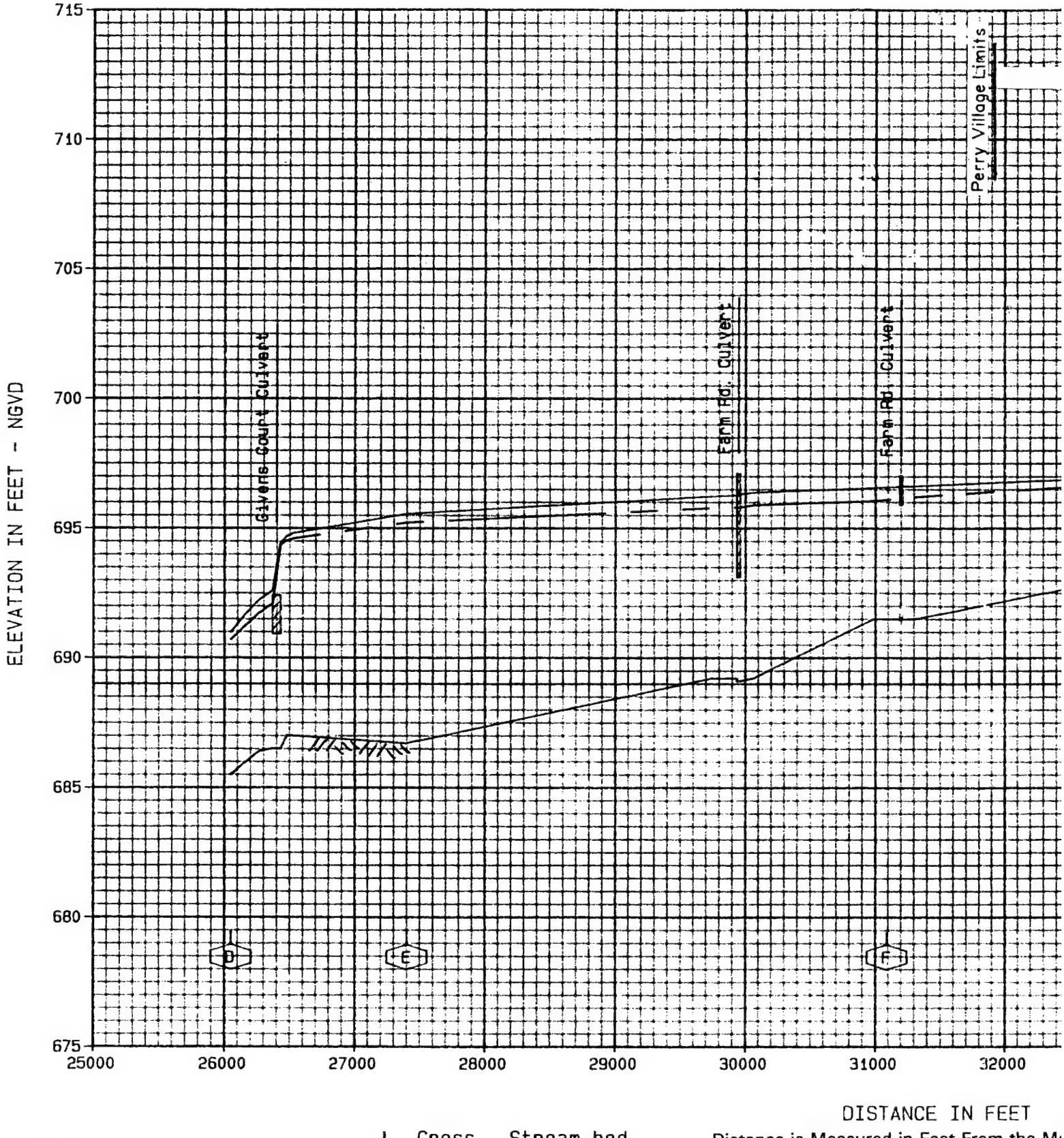
6. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, County of Lake, Ohio (unincorporated areas), Washington, D.C., 1980.


ELEVATION IN FEET - NGVD
720
715
710
705
700
695
690
685
680
-1000
0
1000
2000
3000
4000
5000
6000
Perry Village Limits
School Rd. Br.
Manchester Rd. Br.
Sidewalk Br.
Creek Rd. Culvert
Harper St. Culvert
Conrail Culvert
A
B
C
D
E
F
DISTANCE IN FEET
Measured From the Perry Village
Legend:
500 Year Flood
100 Year Flood
Cross Section
Stream bed
Culvert
Bridge

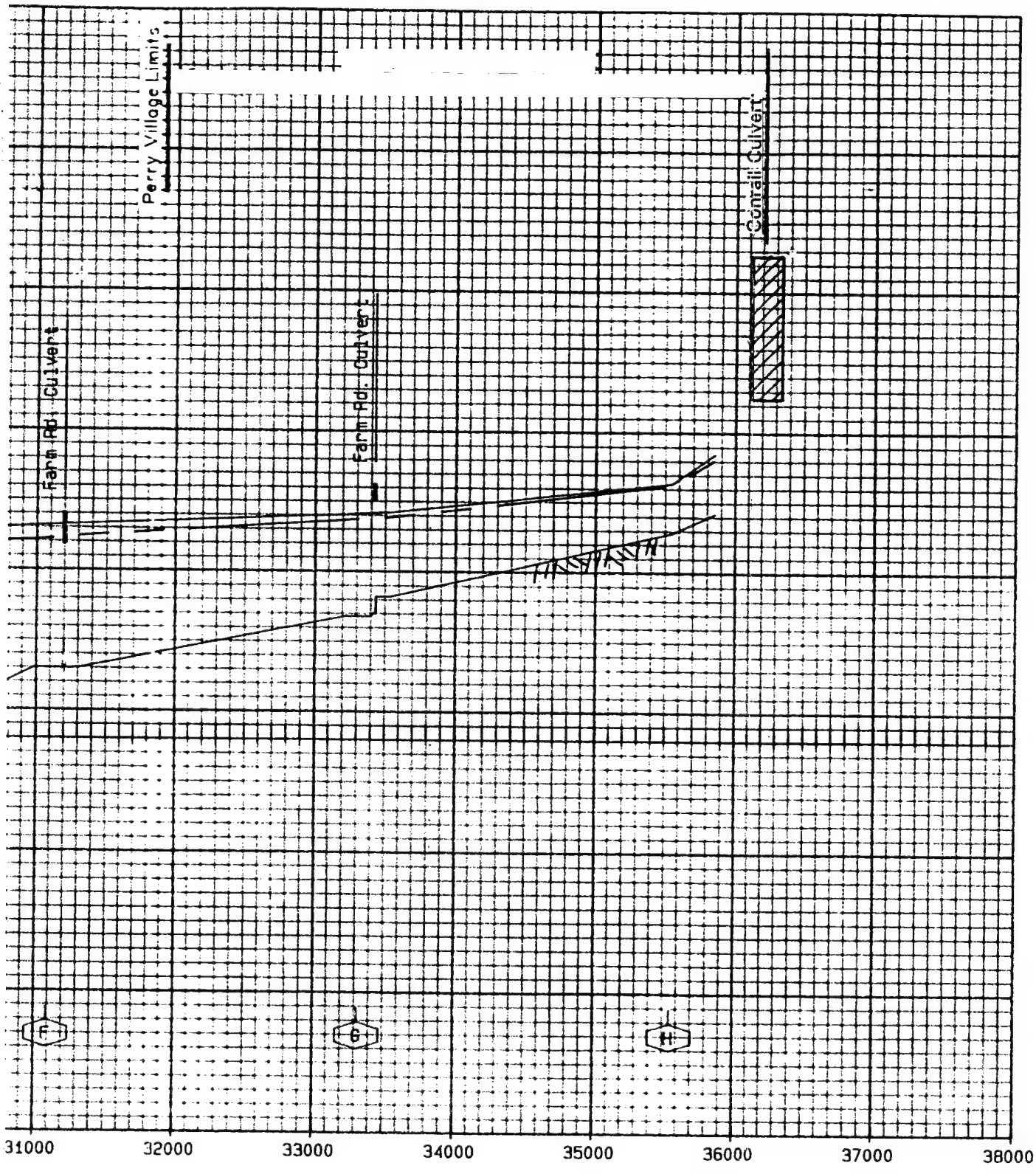


STANCE IN FEET
rom the Perry Village Limits

FLOOD PROFILE
Red Mill Creek
Perry, Ohio
Sheet 1 of 1

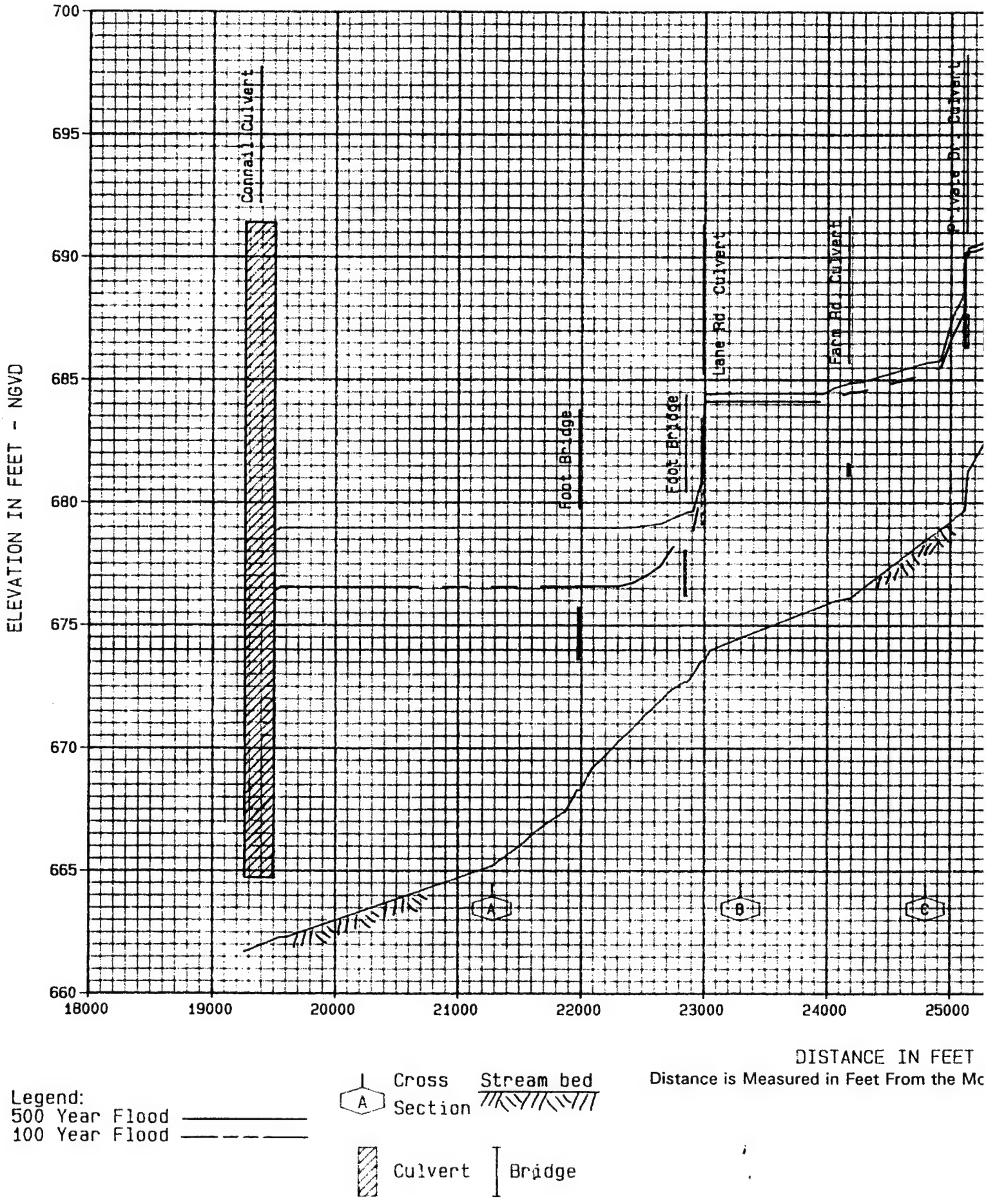


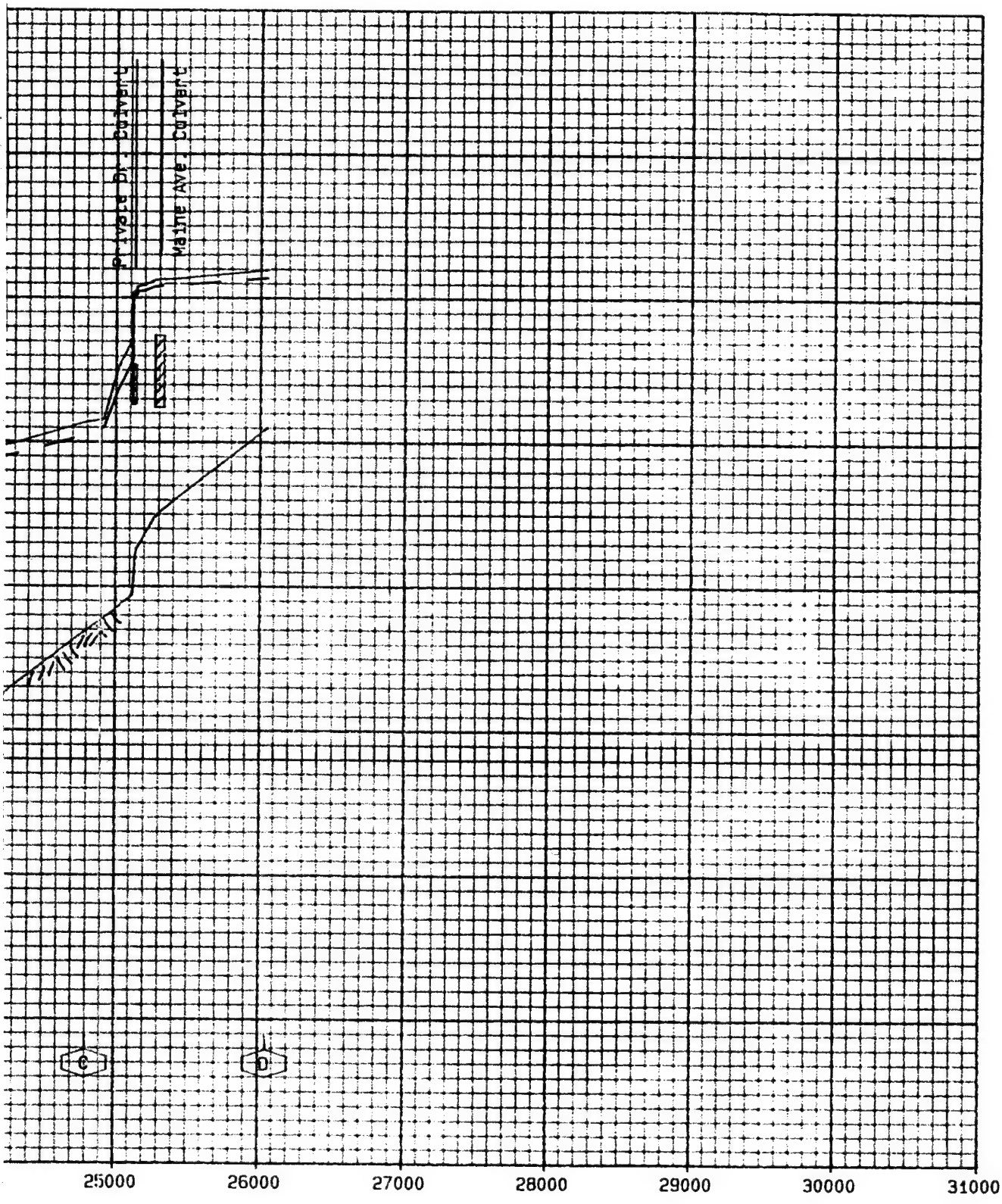
Distance is Measured in Feet From the M



)ISTANCE IN FEET
sured in Feet From the Mouth

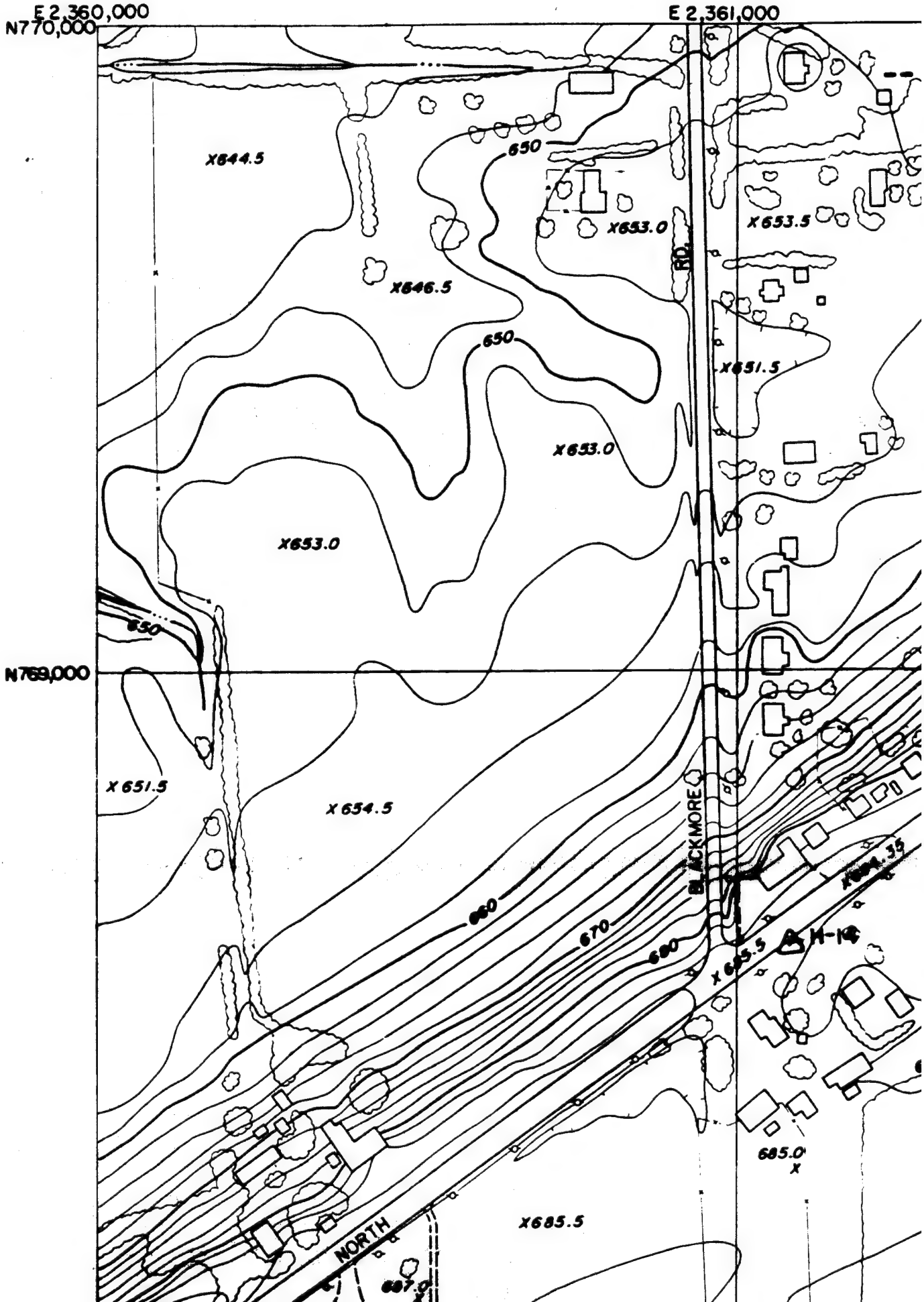
FLOOD PROFILE
Red Creek
Perry, Ohio
Sheet 2 of 2

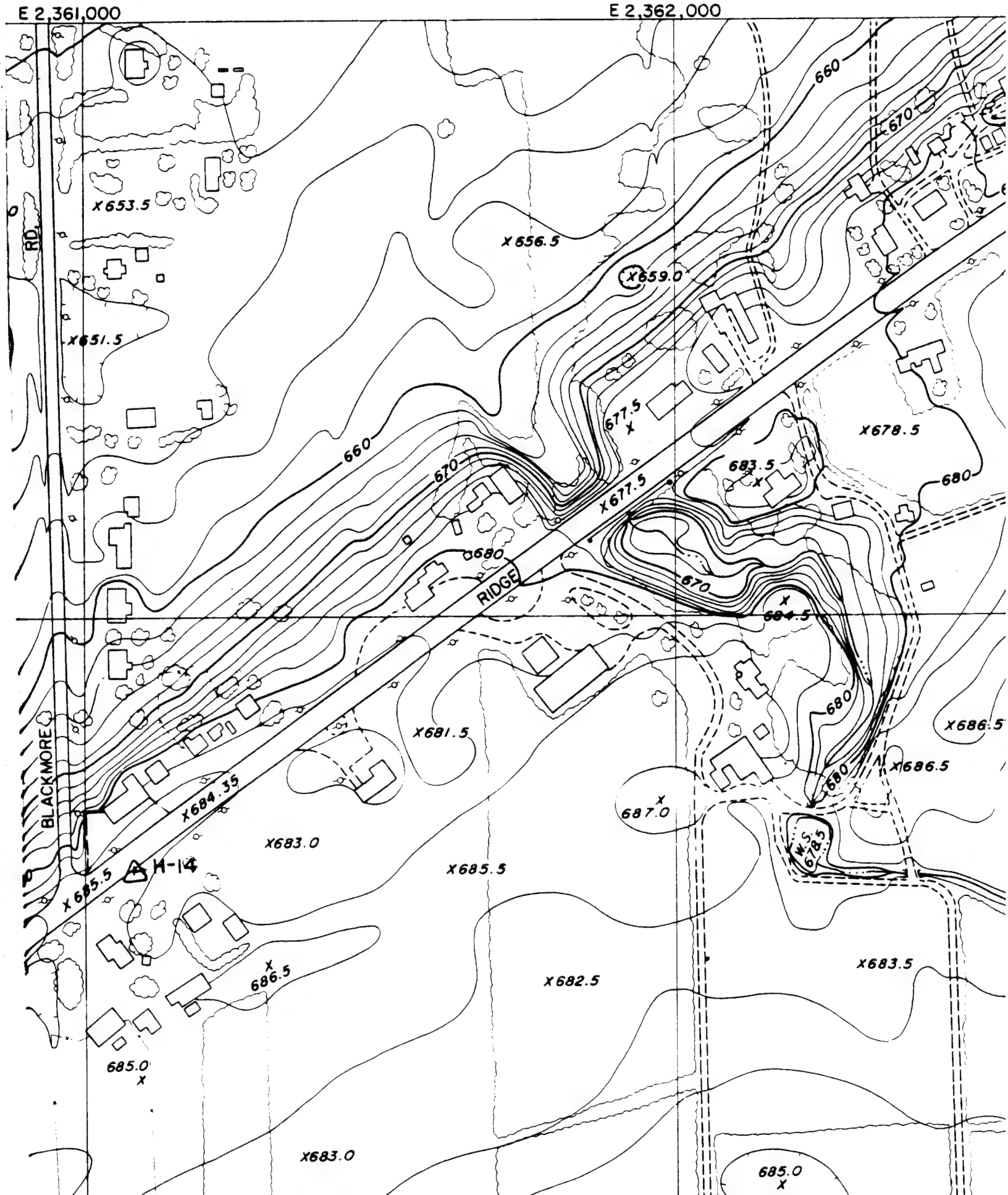

ELEVATION IN FEET - NGVD
700
695
690
685
680
675
670
665
660
18000
19000
20000
21000
22000
23000
24000
25000
Connail Culvert
Foot Bridge
Foot Bridge
Lane Rd. Culvert
Farm Rd. Culvert
Railroad Bridge
A
B
C
DISTANCE IN FEET
Distance is Measured in Feet From the Mc
Legend:
500 Year Flood
100 Year Flood
Cross Section
Stream bed
Culvert
Bridge

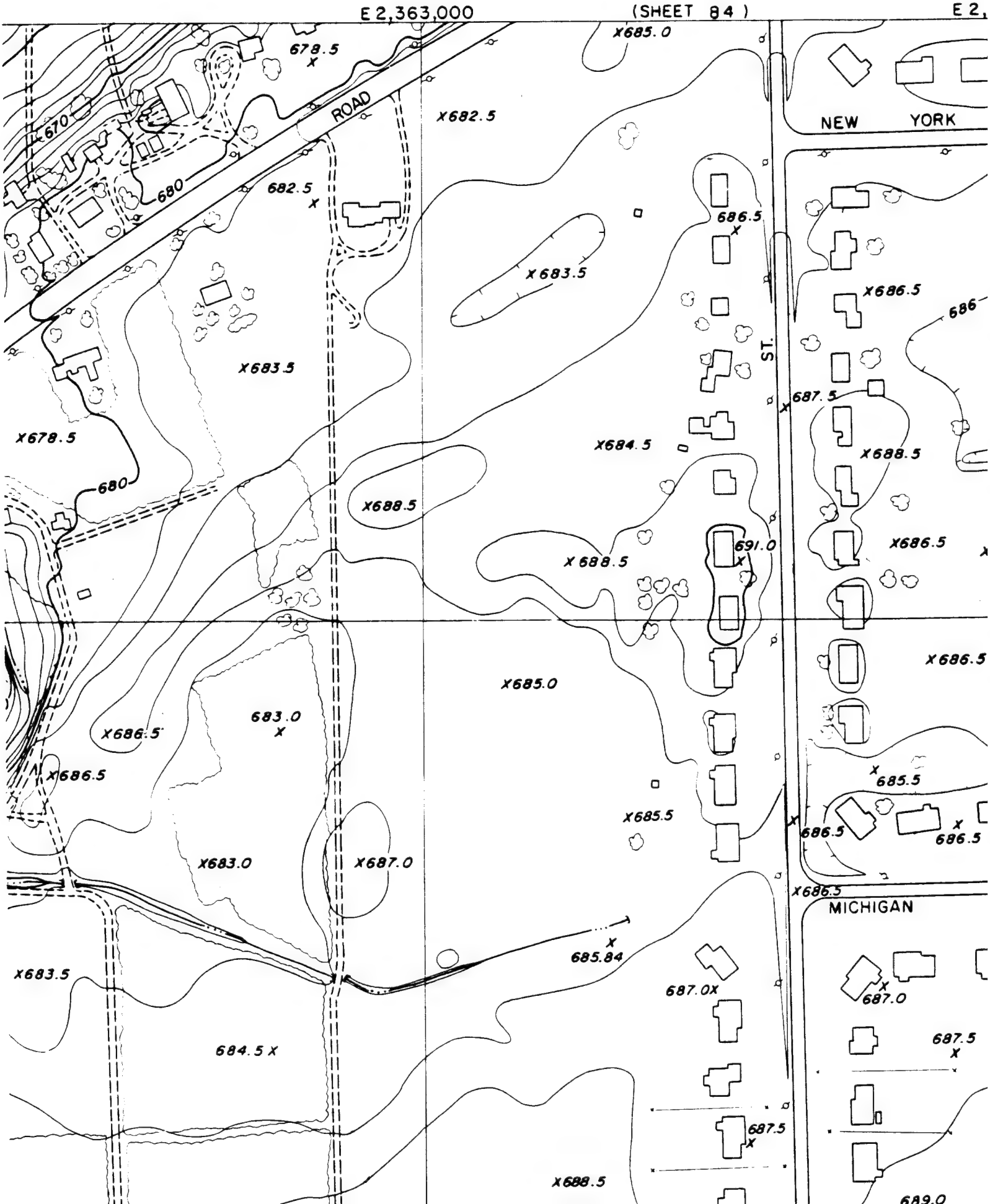


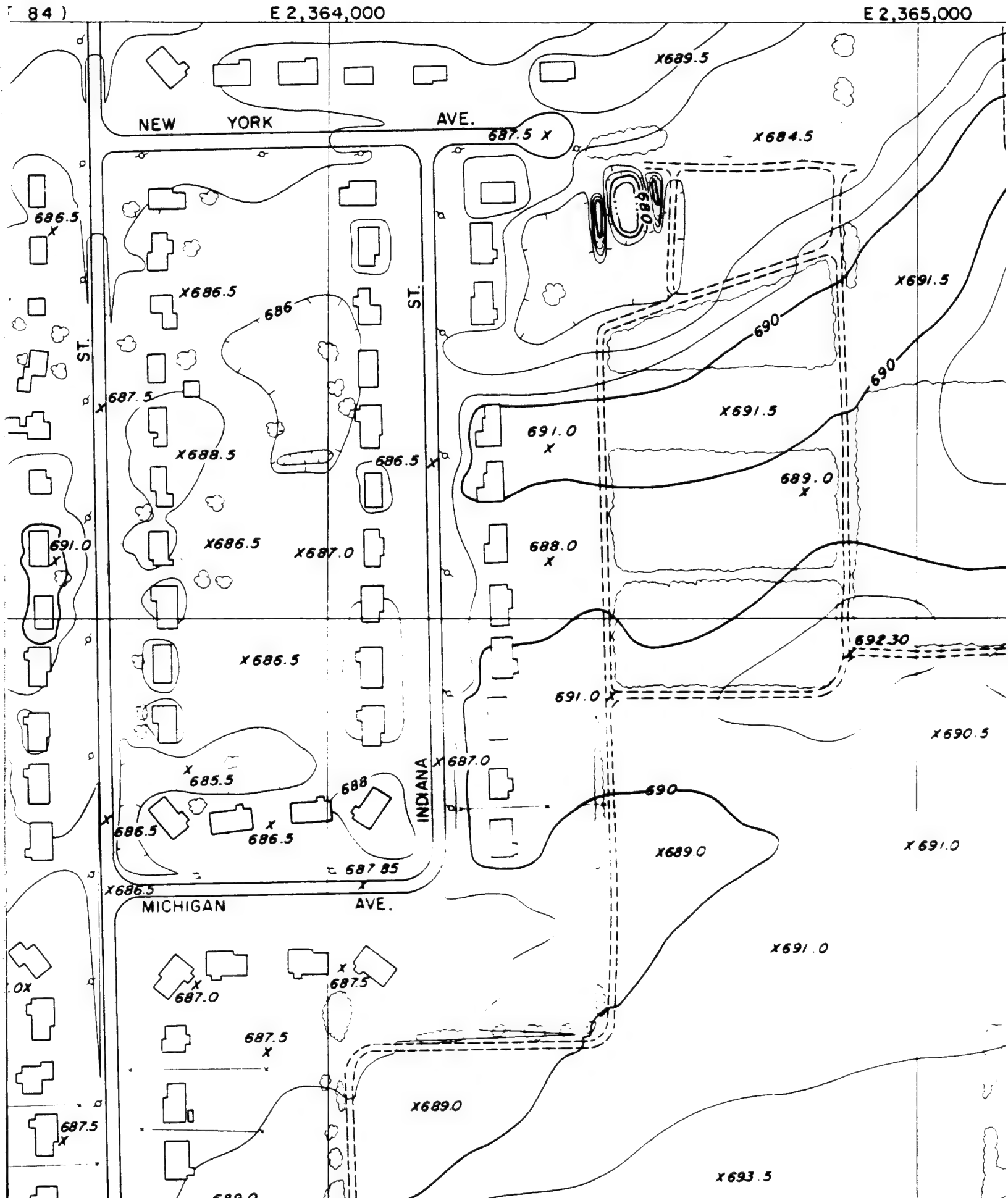
NCE IN FEET
eet From the Mouth at Lake Erie

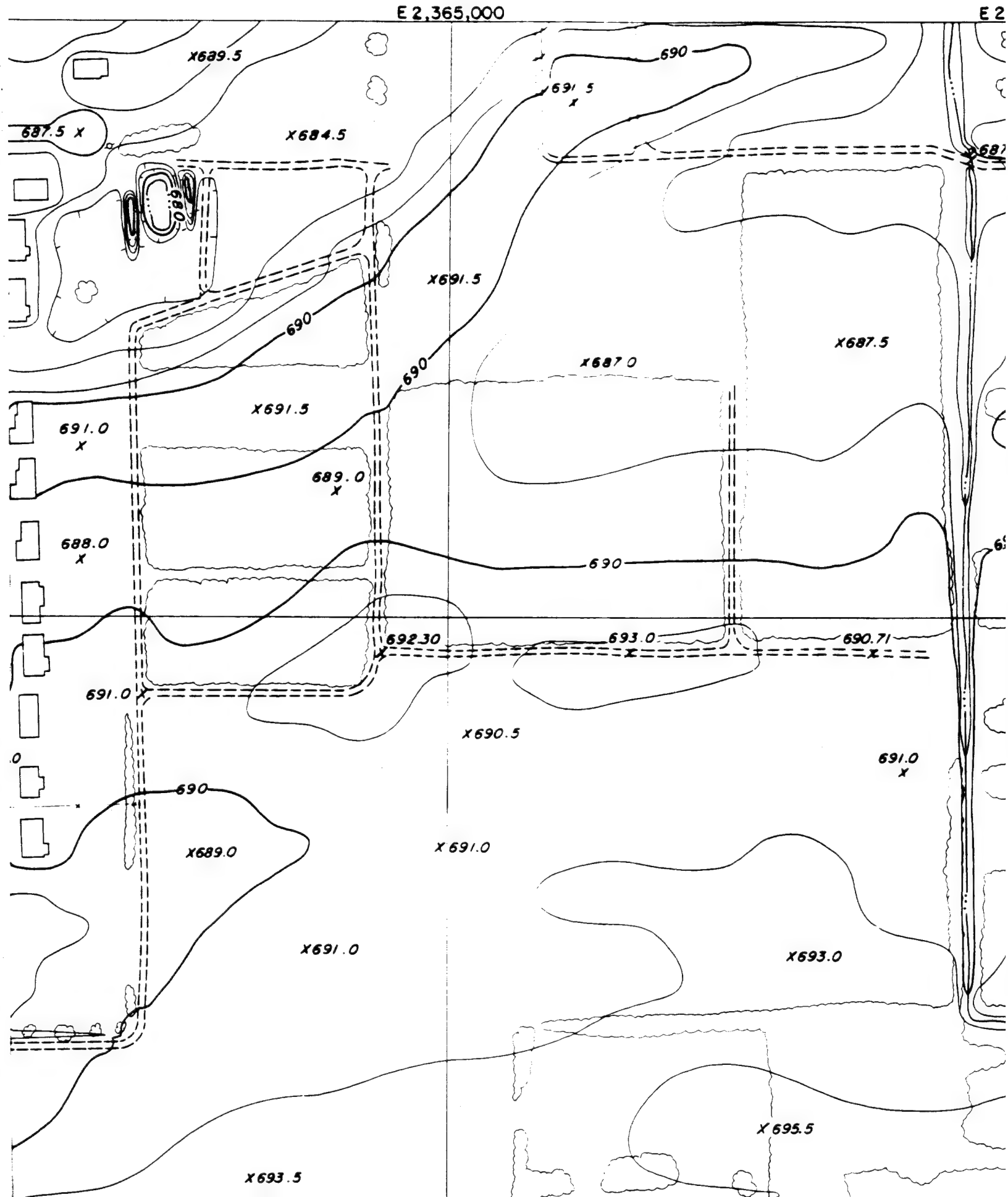
FLOOD PROFILE
Red Creek
Perry, Ohio
Sheet 1 of 2

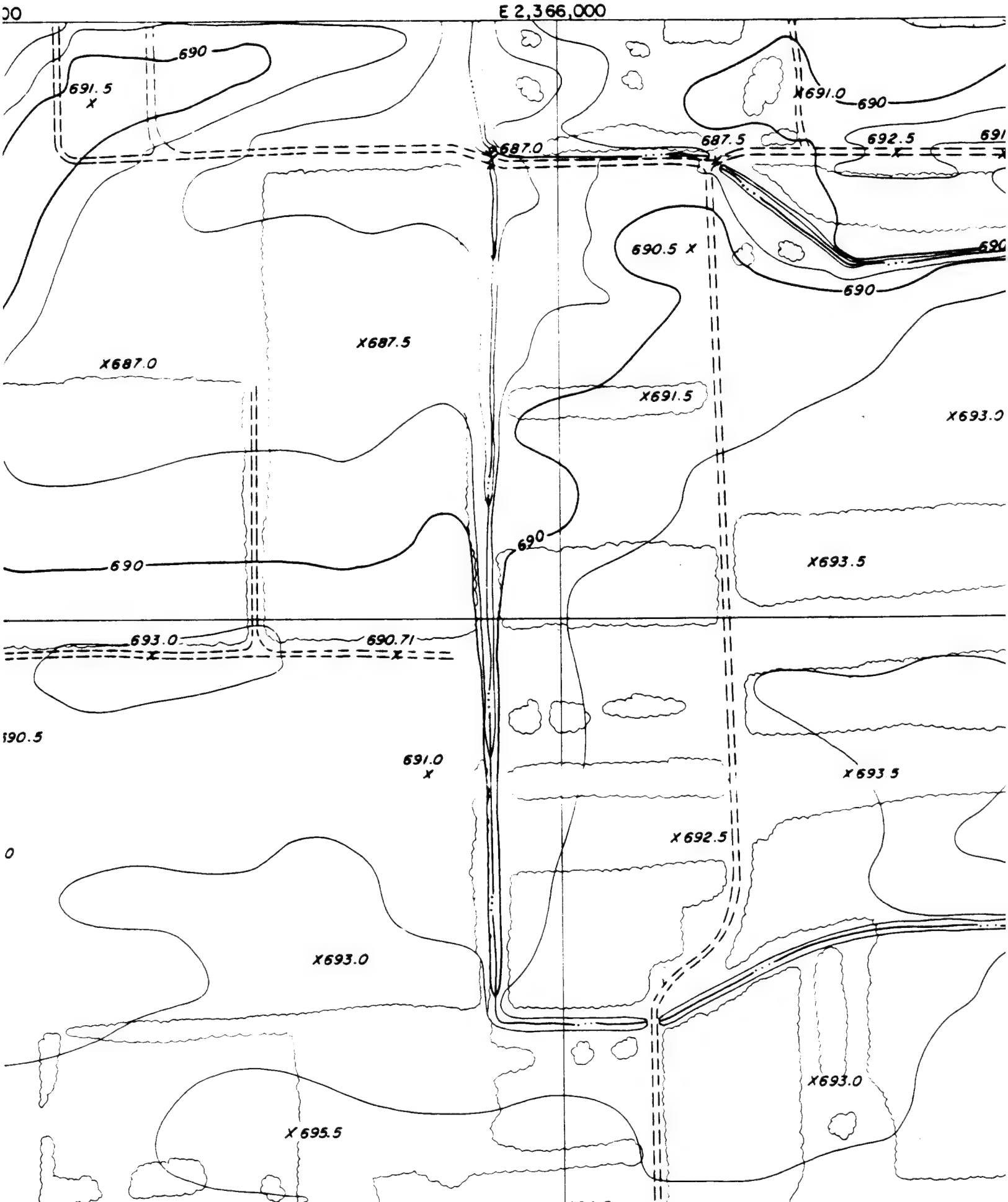

E 2,360,000
E 2,361,000
N770,000
N769,000
X644.5
650
X653.0
X653.5
RD.
X646.5
650
X651.5
X653.0
X653.0
650
X651.5
X654.5
BLACKMORE
660
670
680
X685.5
H-14
685.0
X
NORTH
687.0
X685.5

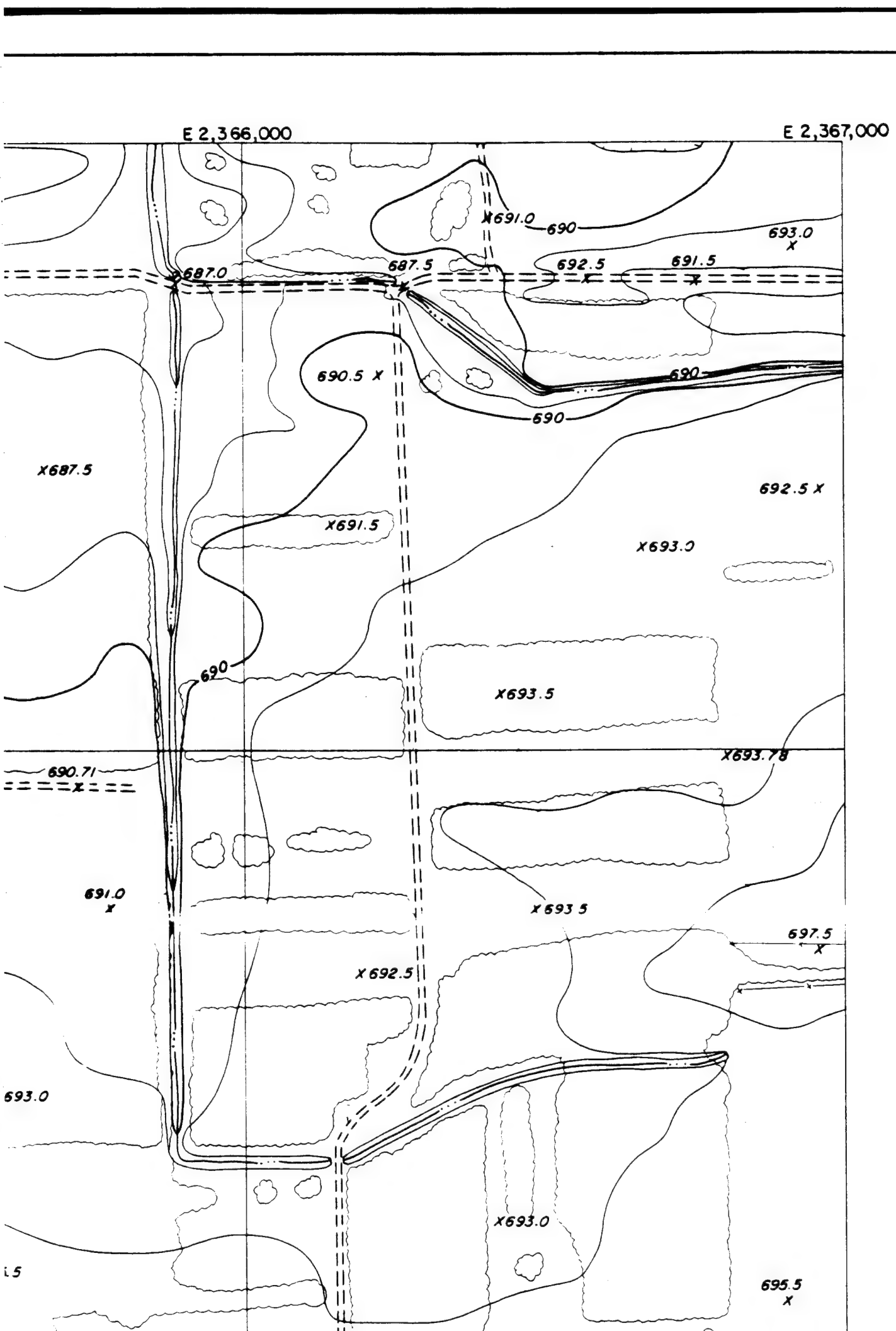

E 2,361,000
E 2,362,000
RD
BLACKMORE
RIDGE
660
670
680
X653.5
X656.5
X659.0
X651.5
677.5
X677.5
X678.5
683.5
X684.5
X681.5
X686.5
X684.35
687.0
X683.0
X685.5
H-14
X685.5
686.5
X682.5
X683.5
685.0
X683.0
685.0

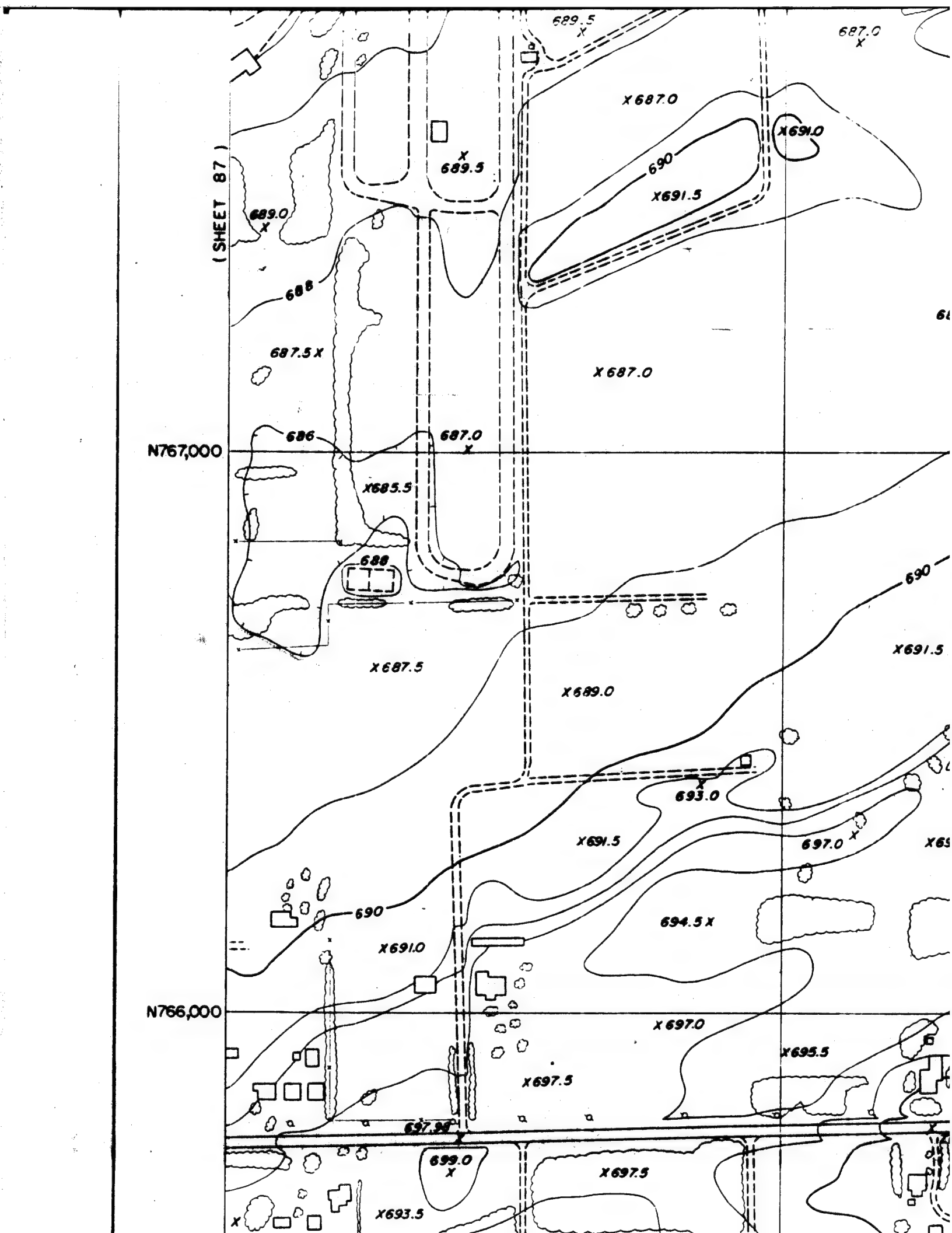

E 2,363,000
(SHEET 84)
E 2,
678.5
670
ROAD
680
682.5
685.0
682.5
683.5
686.5
686.5
686
ST.
687.5
683.5
678.5
680
684.5
688.5
688.5
691.0
688.5
686.5
686.5
685.0
683.0
686.5
686.5
685.5
685.5
686.5
686.5
683.0
687.0
686.5
MICHIGAN
685.84
687.0X
687.0
687.5
683.5
684.5 X
687.5
688.5
689.0

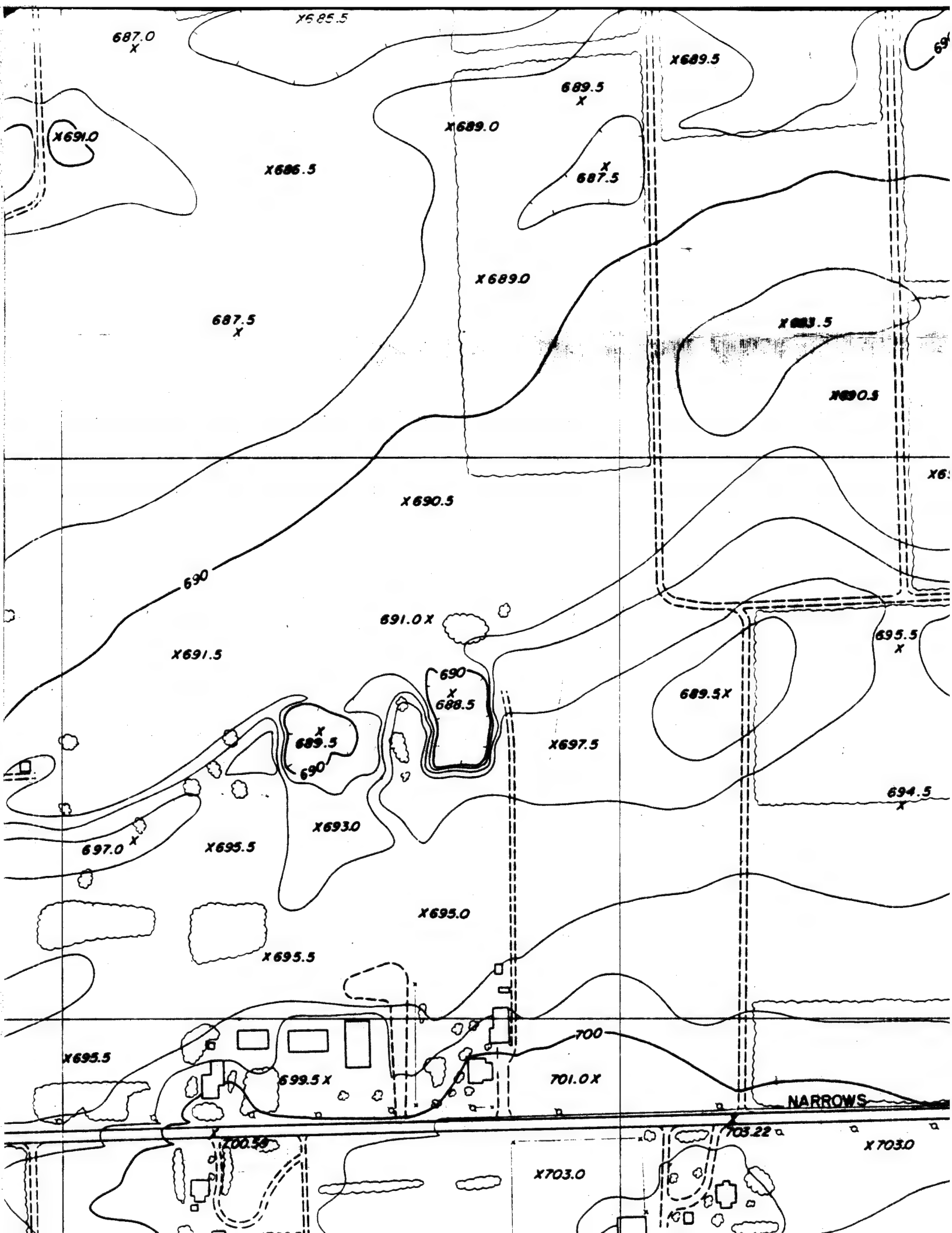

E 2,364,000
E 2,365,000
NEW YORK AVE.
MICHIGAN AVE.
ST.
ST.
INDIANA
X689.5
687.5 X
X684.5
686.5
X686.5
686
687.5
X688.5
686.5
691.0
X686.5
X687.0
688.0
X691.5
691.0
689.0
690
690
692.30
X690.5
X686.5
685.5
688
686.5
686.5
687.85
X686.5
687.0
687.5
687.5
687.5
X689.0
X691.0
X691.0
X689.0
X693.5

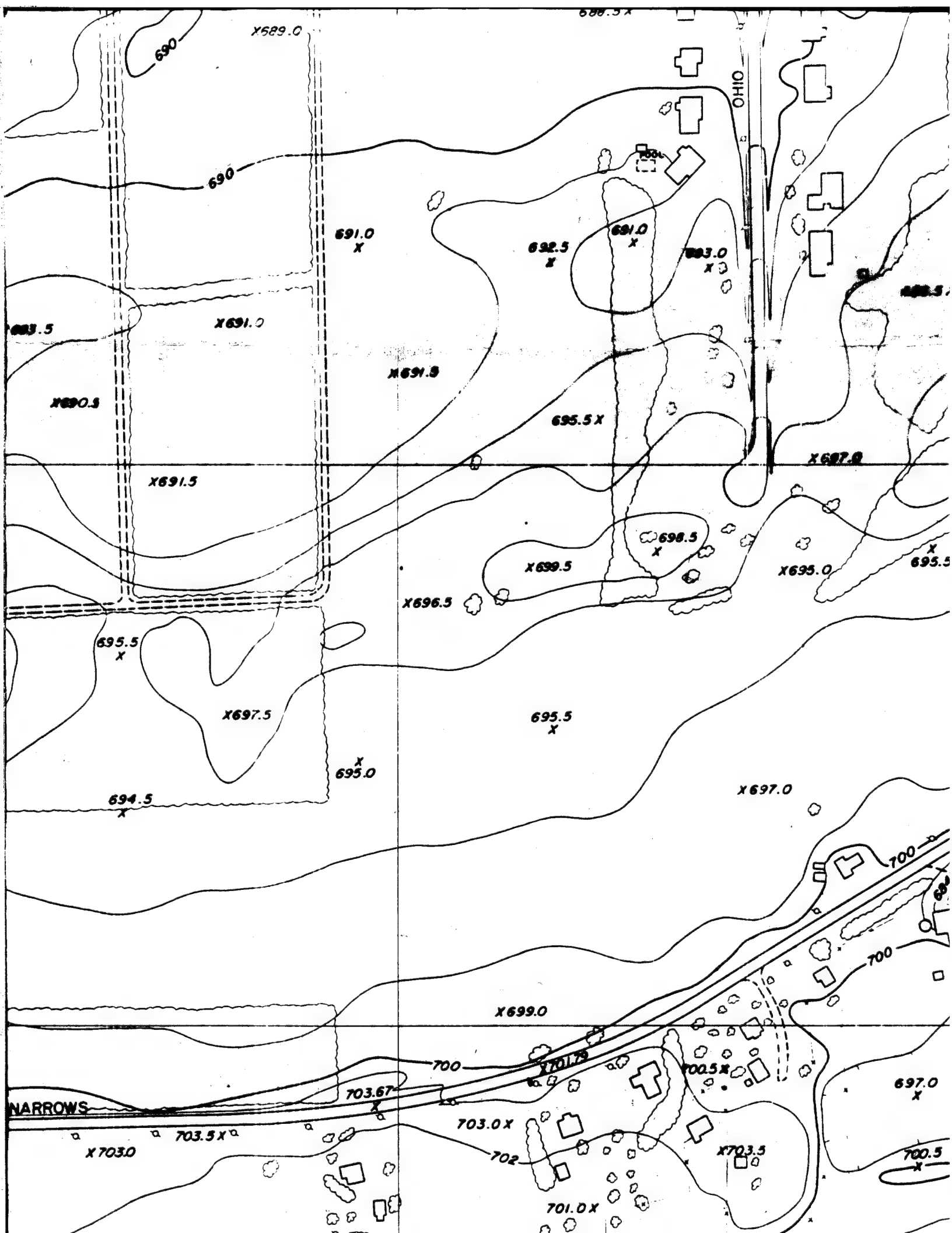

E 2,365,000
E 2
X689.5
690
691.5
X
687.5 X
X684.5
680
X691.5
690
690
X687.0
X687.5
X691.5
691.0
X
689.0
X
688.0
X
690
692.30
X
693.0
X
690.71
X
691.0
X
X690.5
691.0
X
690
X689.0
X691.0
X691.0
X693.0
X695.5
X693.5

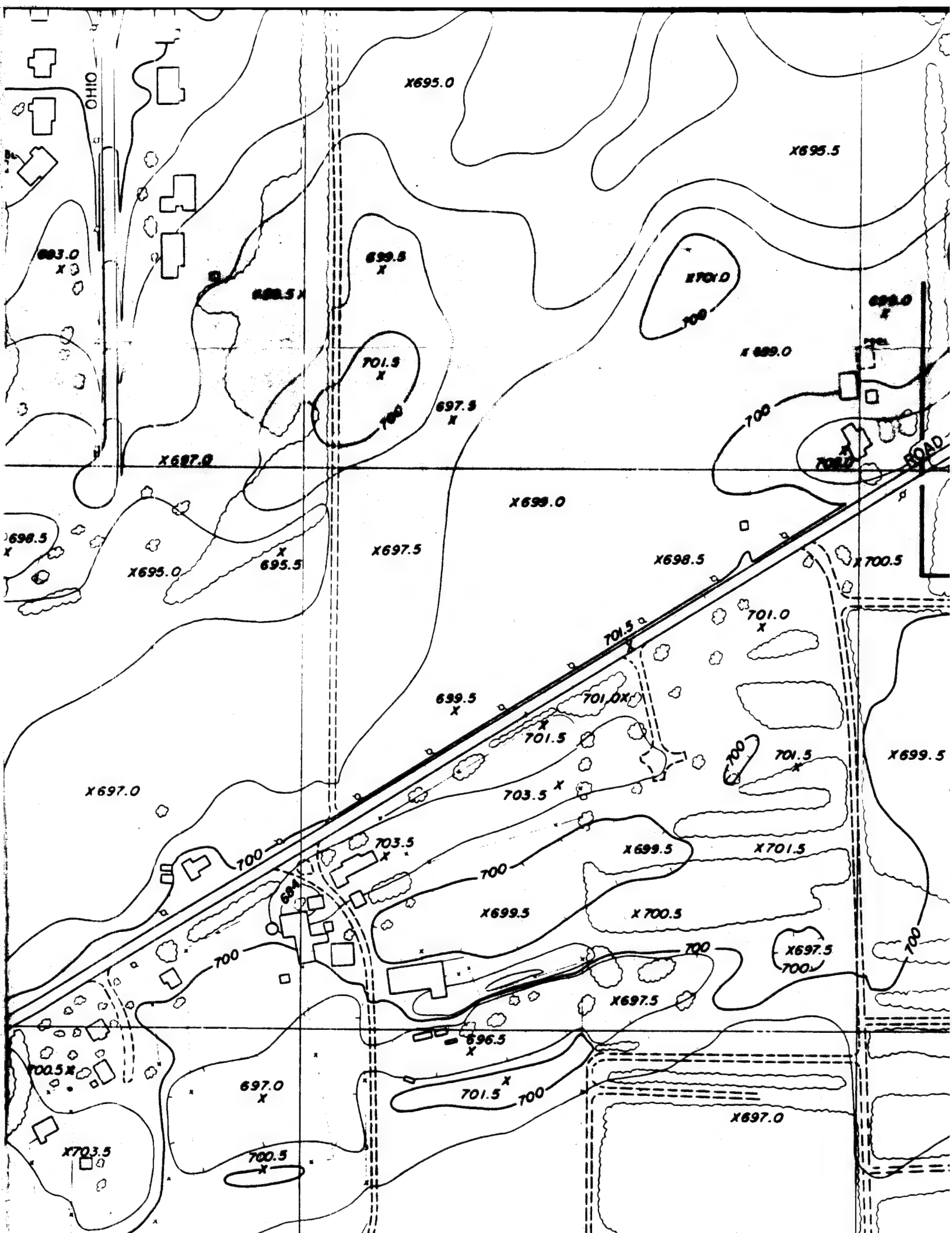

E 2,366,000
690
691.5
X
X691.0
690
687.0
687.5
692.5
690.5 X
690
X687.5
X687.0
X691.5
X693.0
690
690
X693.5
693.0
690.71
691.0
X
X693.5
X692.5
X693.0
X695.5
X693.0

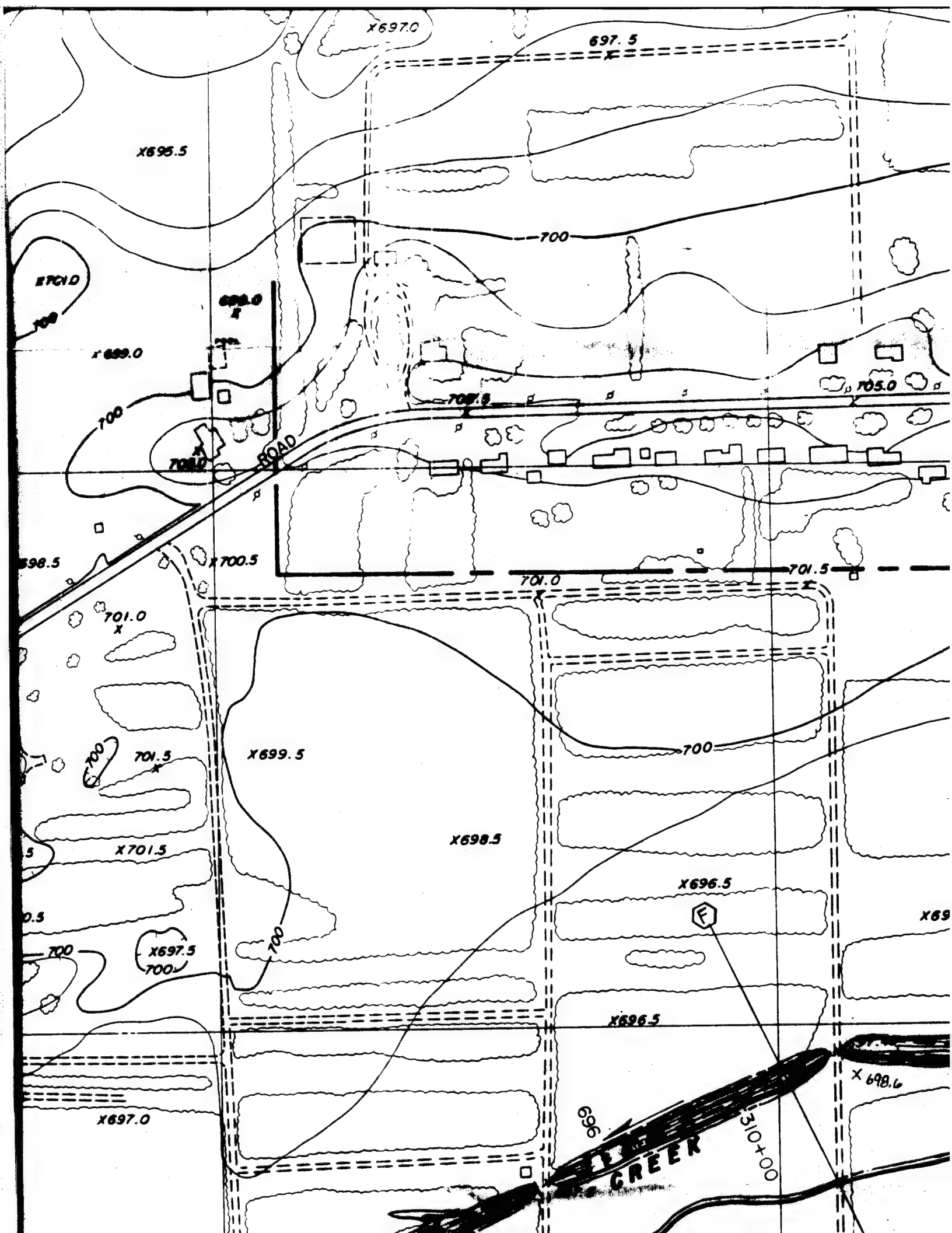

E 2,366,000
E 2,367,000
691.0
690
693.0
687.0
687.5
692.5
691.5
690.5
690
690
687.5
692.5
691.5
693.0
690
693.5
690.71
693.78
691.0
693.5
697.5
692.5
693.0
693.0
695.5

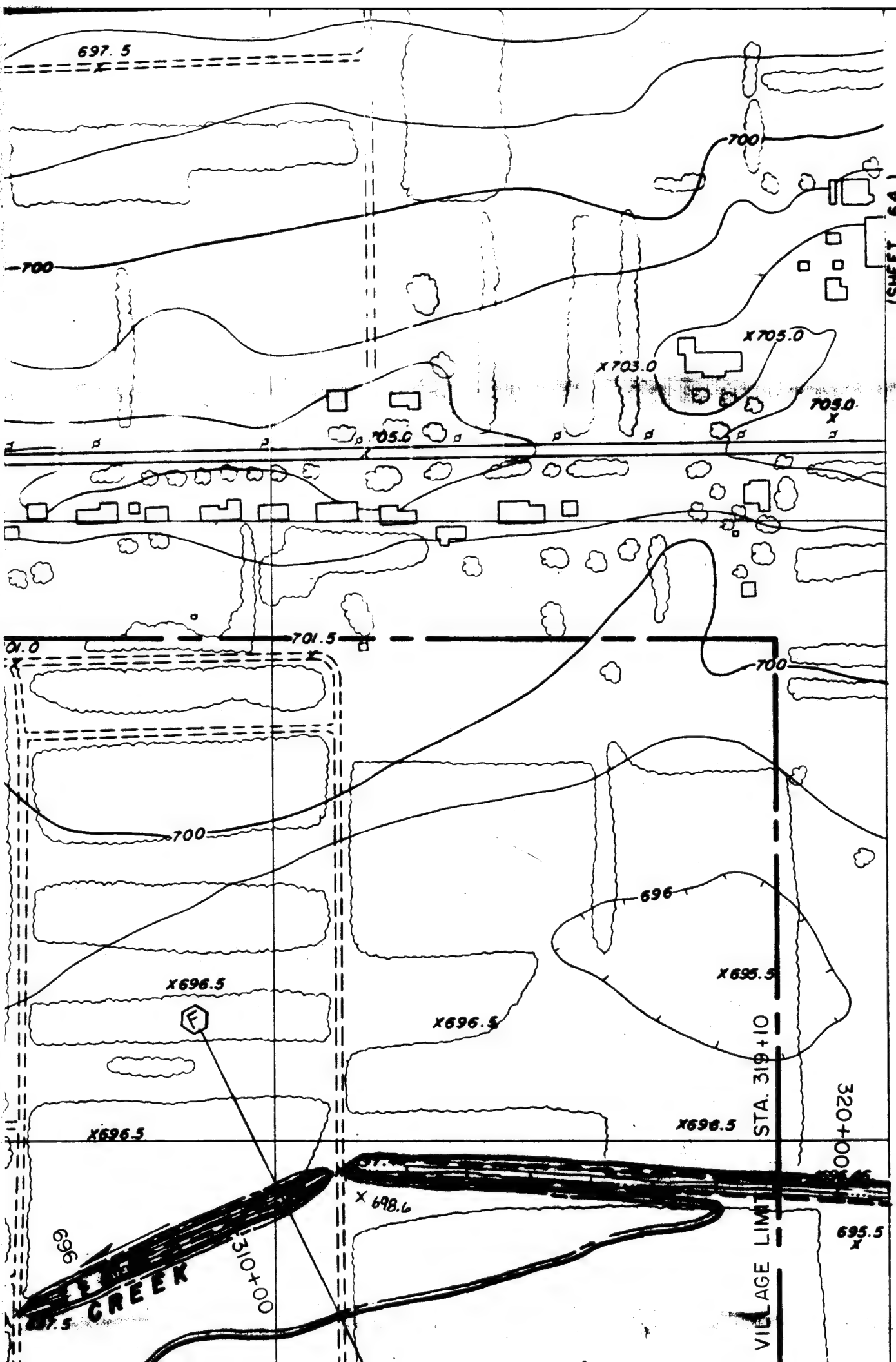

(SHEET 87)
N767,000
N766,000
689.5
687.0
X687.0
X691.0
690
X691.5
689.0
688
687.5X
X687.0
686
687.0
X685.5
688
690
X691.5
X687.5
X689.0
693.0
X691.5
697.0
690
694.5X
X691.0
X697.0
X695.5
X697.5
697.98
699.0
X697.5
X693.5

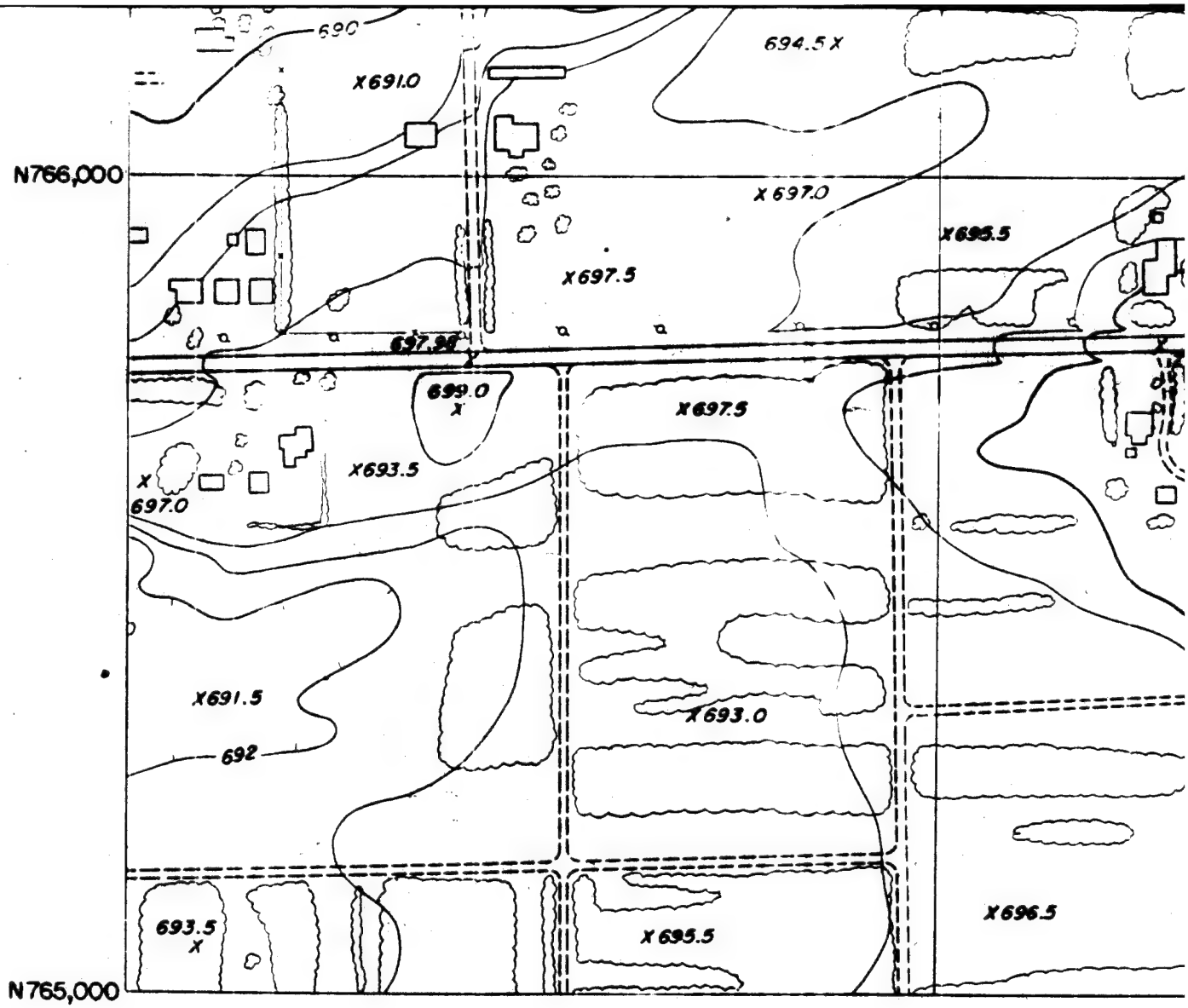

687.0
X685.5
X689.5
689.5
X691.0
X689.0
X686.5
687.5
X689.0
687.5
X690.5
690
691.0X
X691.5
695.5
690
688.5
689.5X
689.5
690
X697.5
694.5
697.0
X693.0
X695.5
X695.0
X695.5
X695.5
700
699.5X
701.0X
NARROWS
700.58
703.22
X703.0
X703.0


X689.0
690
690
OHIO
691.0
X
692.5
X
691.0
X
693.0
X
X691.0
X691.5
X690.5
695.5 X
X697.0
X691.5
698.5
X
X699.5
X695.0
695.5
X
X696.5
695.5
X
X697.5
695.0
X
694.5
X
X697.0
700
700
X699.0
700
X701.75
700.5 X
703.67
X
NARROWS
703.5 X
X703.0
703.0 X
702
X703.5
697.0
X
700.5
X
701.0 X


OHIO
X695.0
X695.5
693.0
699.5
701.0
700
699.0
701.5
697.5
700
ROAD
X697.0
X699.0
698.5
X697.5
X695.0
695.5
X698.5
700.5
701.0
701.5
699.5
701.0
701.5
701.5
X699.5
X697.0
703.5
703.5
700
X699.5
X701.5
700
684
X699.5
X 700.5
700
700
X697.5
700
X697.5
696.5
700.5
697.0
701.5
700
X697.0
X703.5
700.5


X697.0
697.5
X695.5
700
700
X699.0
705.0
ROAD
X700.5
701.5
701.0
701.0
700
701.5
X699.5
X698.5
X701.5
X696.5
700
X697.5
700
700
X696.5
X698.6
696
310+00
CREEK
X697.0


697.5
700
700
(SHEET 64)
X705.0
X703.0
705.0
X
705.0
701.5
700
700
696
X695.5
X696.5
X696.5
X696.5
X696.5
STA. 319+10
320+00
X 698.6
695.5
X
696
697.5
CREEK
310+00
VILLAGE LIMIT



OHIO COORDINATE SYSTEM
LAMBERT GRID

ELEVATIONS ARE BASED ON
MEAN SEA LEVEL 1927
NORTH AMERICAN DATUM

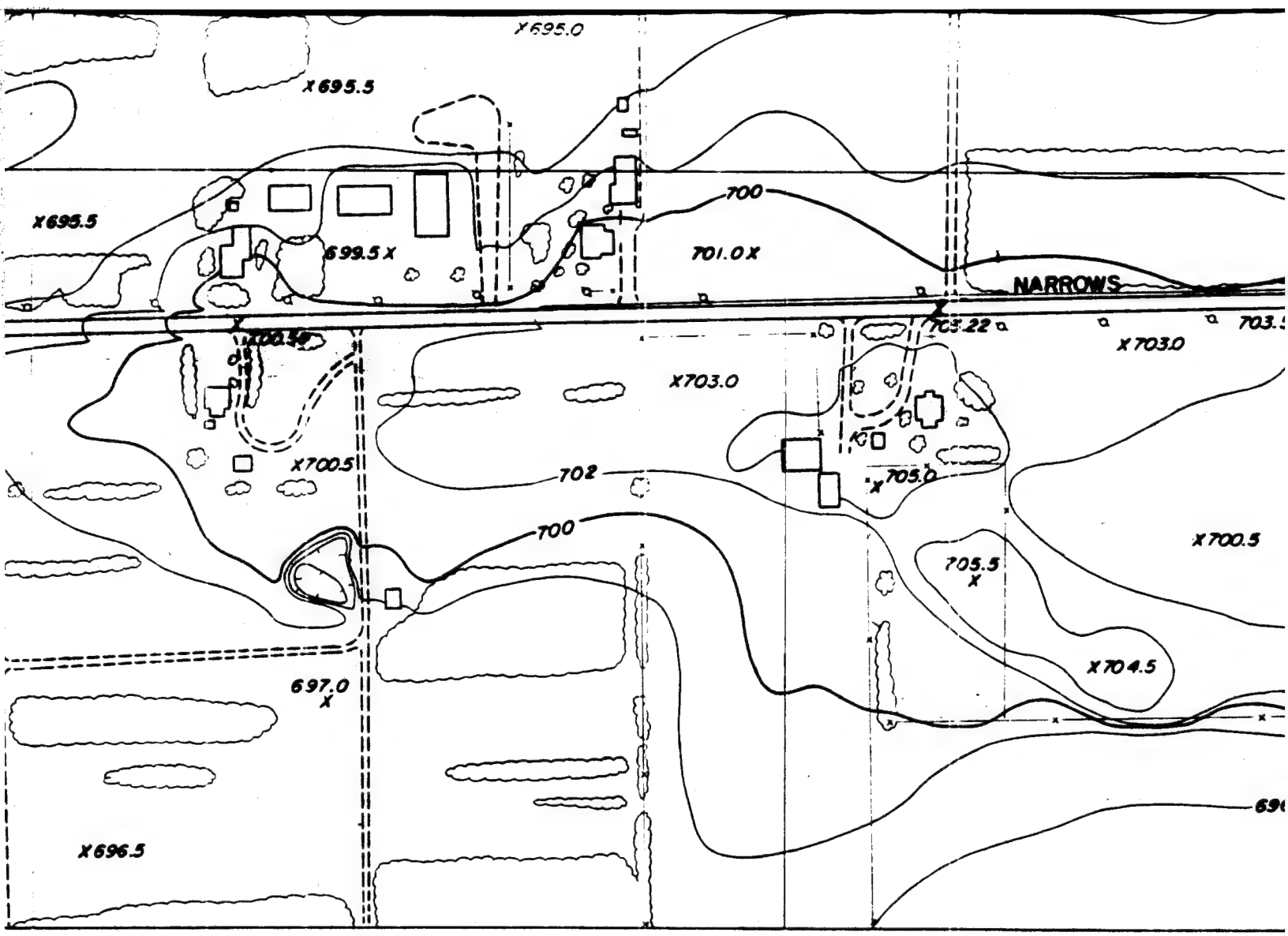
PREPARED BY:
KUCERA & ASSOCIATES INC.
PHOTOGRAMMETRIC ENGINEERS
MENTOR, OHIO

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS

A

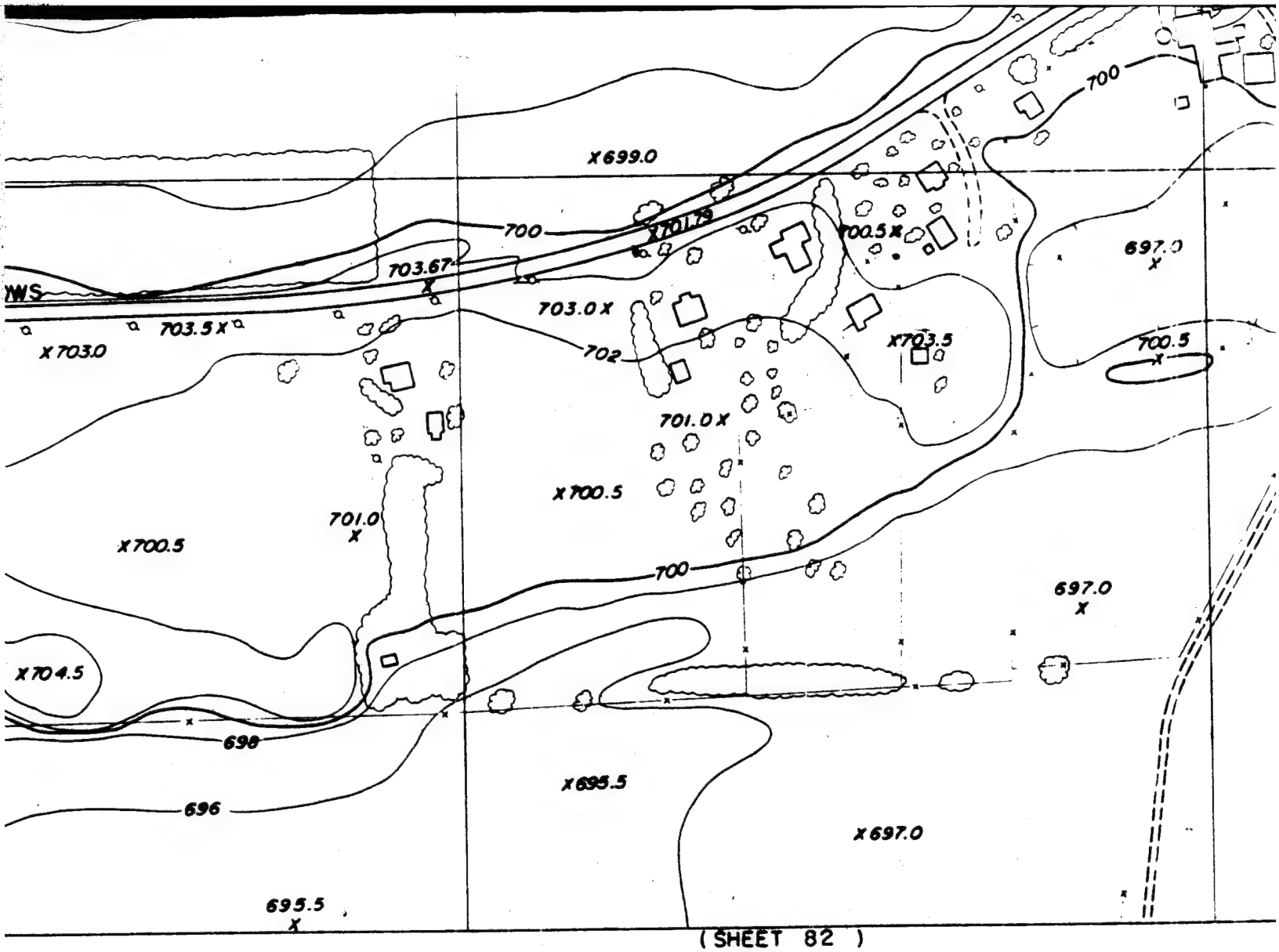
RMI X

650



LEGEND

- 100 YEAR FLOOD LIMITS
- 500 YEAR FLOOD LIMITS
- FLOODWAY LIMITS
- A — A CROSS SECTION LOCATION
- RMI X ELEVATION REFERENCE MARK
- HYDRAULIC BASELINE
- 650 BASE FLOOD ELEVATION



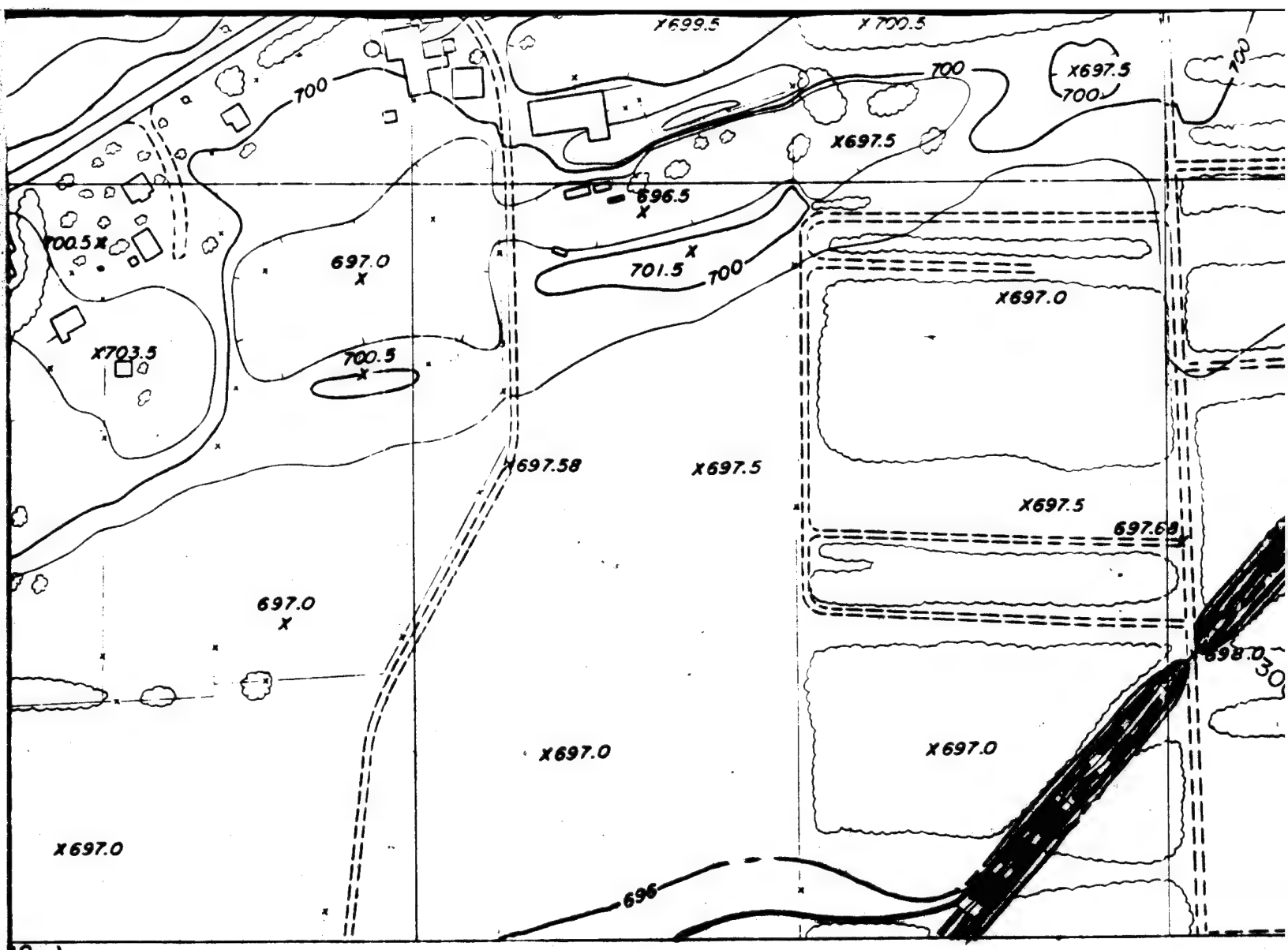
(SHEET 82)

200 100 0 200 400 600 FEET

SCALE: 1" = 200' CONTOUR INTERVAL: 2'

DATE OF PHOTOGRAPHY

NOVEMBER, 1966 – JANUARY 1967



2)

200 400 600 FEET

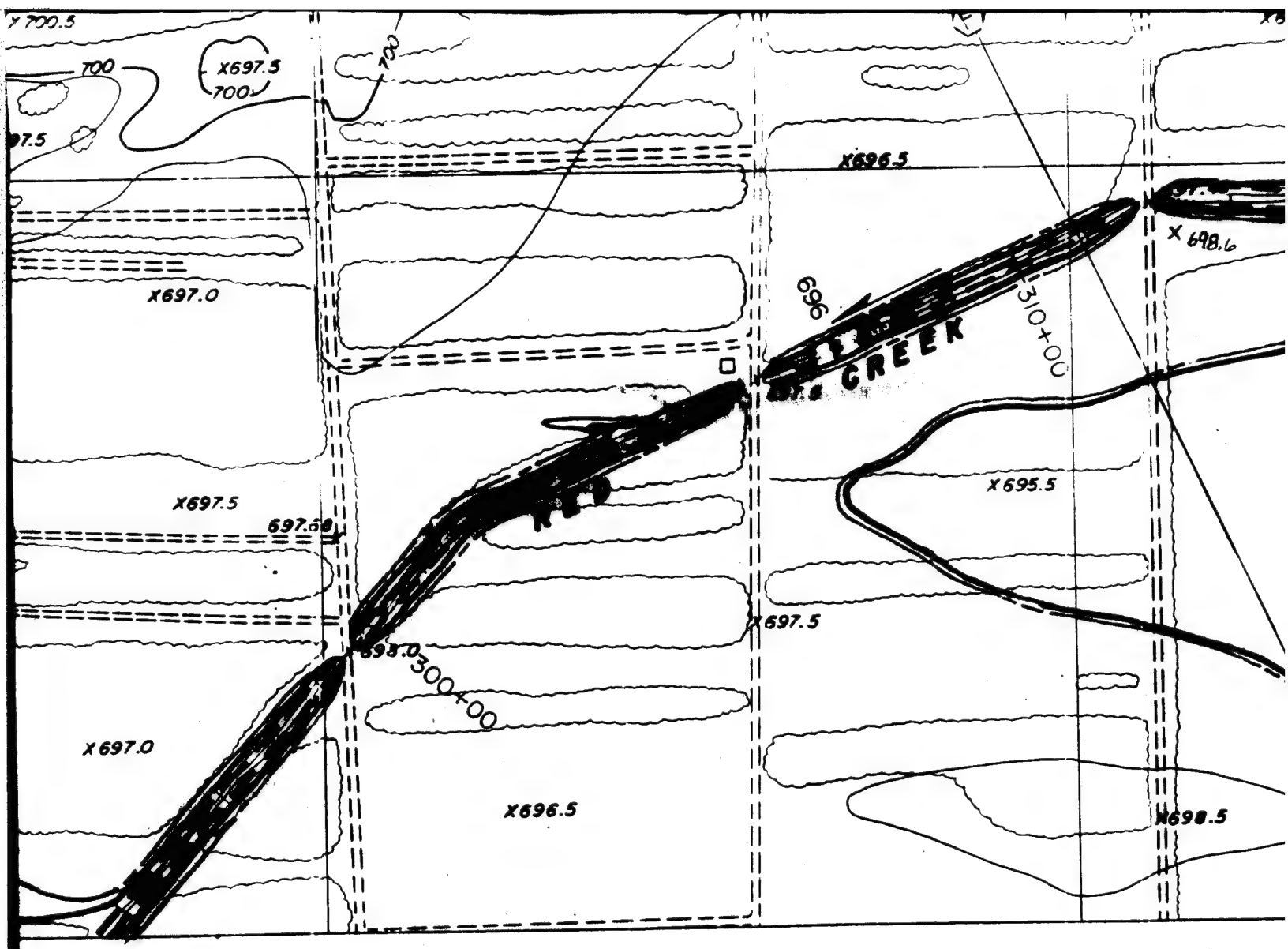
CONTOUR INTERVAL: 2'

PHOTOGRAPHY

5 – JANUARY 1967

N

RED



N

	83	64	56
88	82	65	55

LAKE

TO

BOARD OF LA

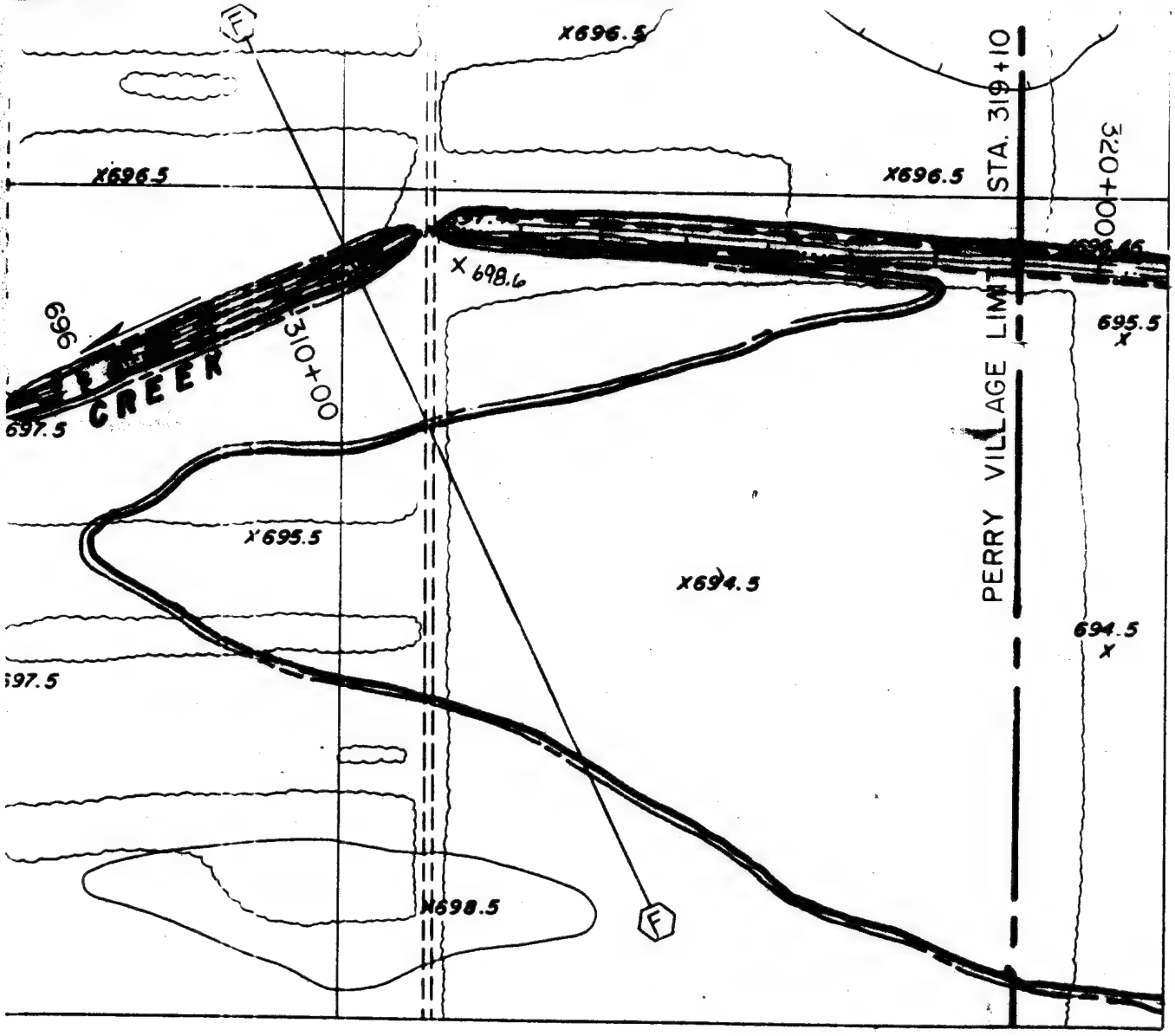
ROBE

JOHN D

RED CREEK - RED MILL CREEK

FLOODED AREA MAP

VILLAGE OF PERRY, OHIO



LAKE COUNTY, OHIO

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSIONERS

ROBERT B. FULTON, CHAIRMAN

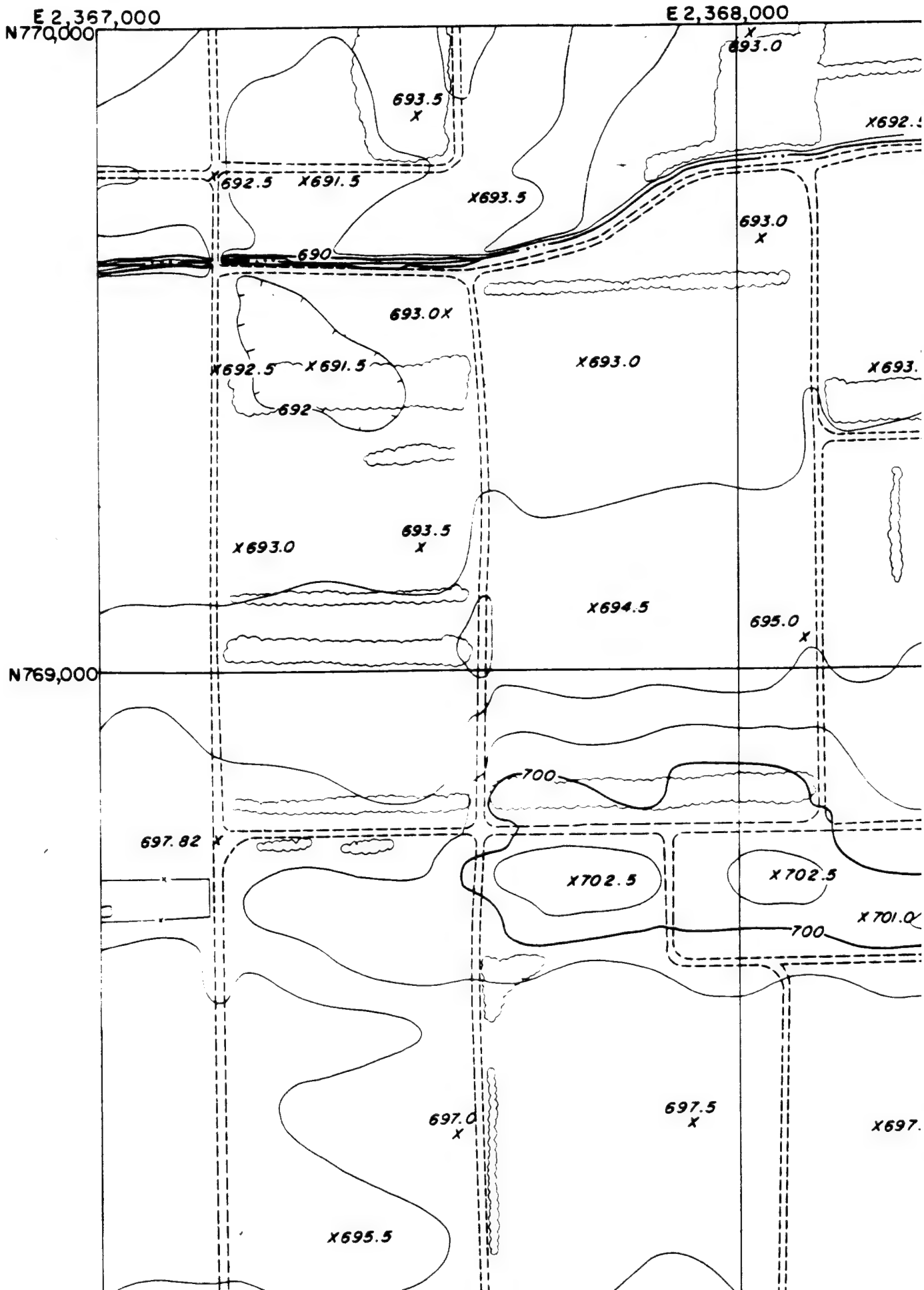
JOHN D. HADDEN – HOWARD B. BEEBE

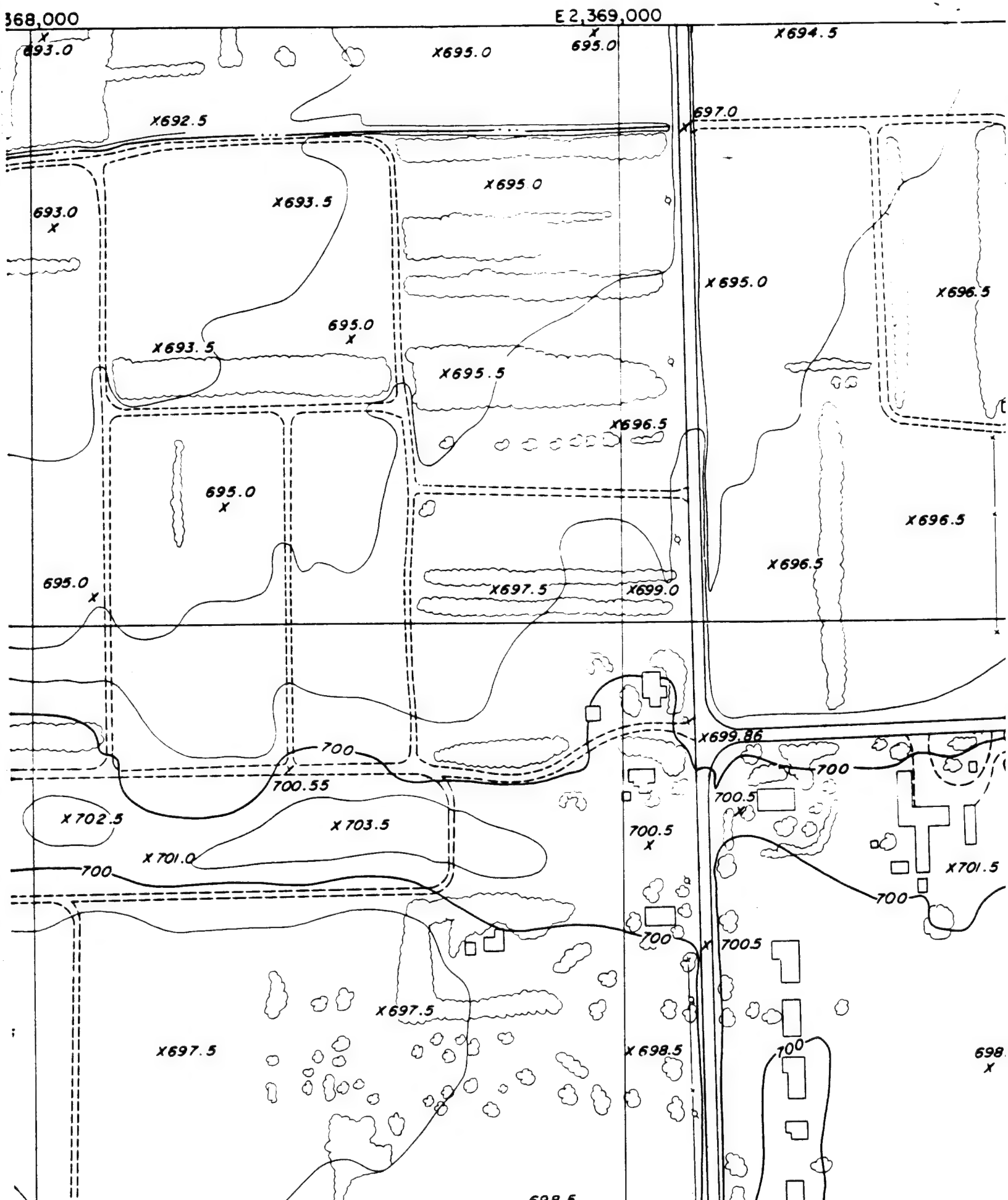
6
5

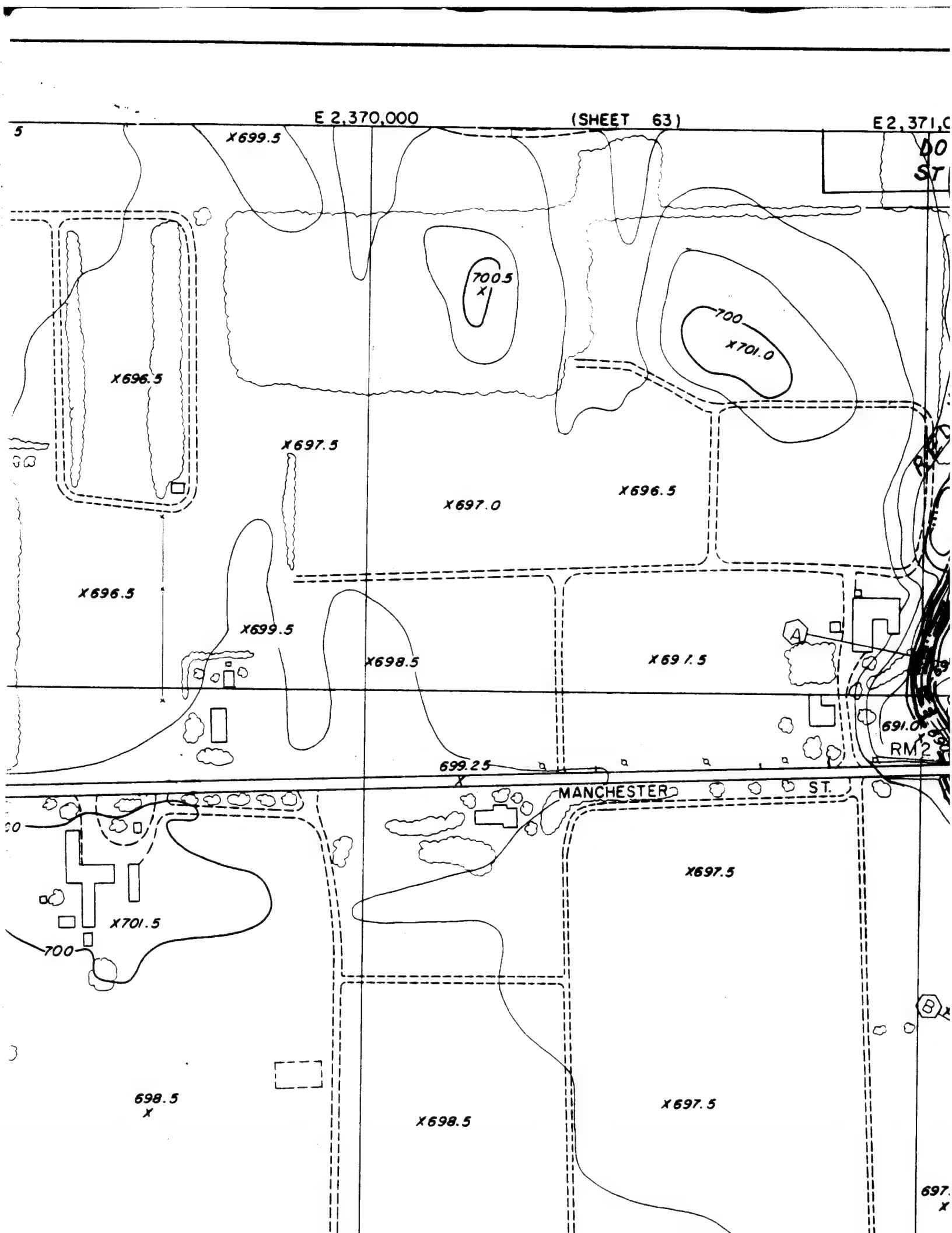
ILL CREEK

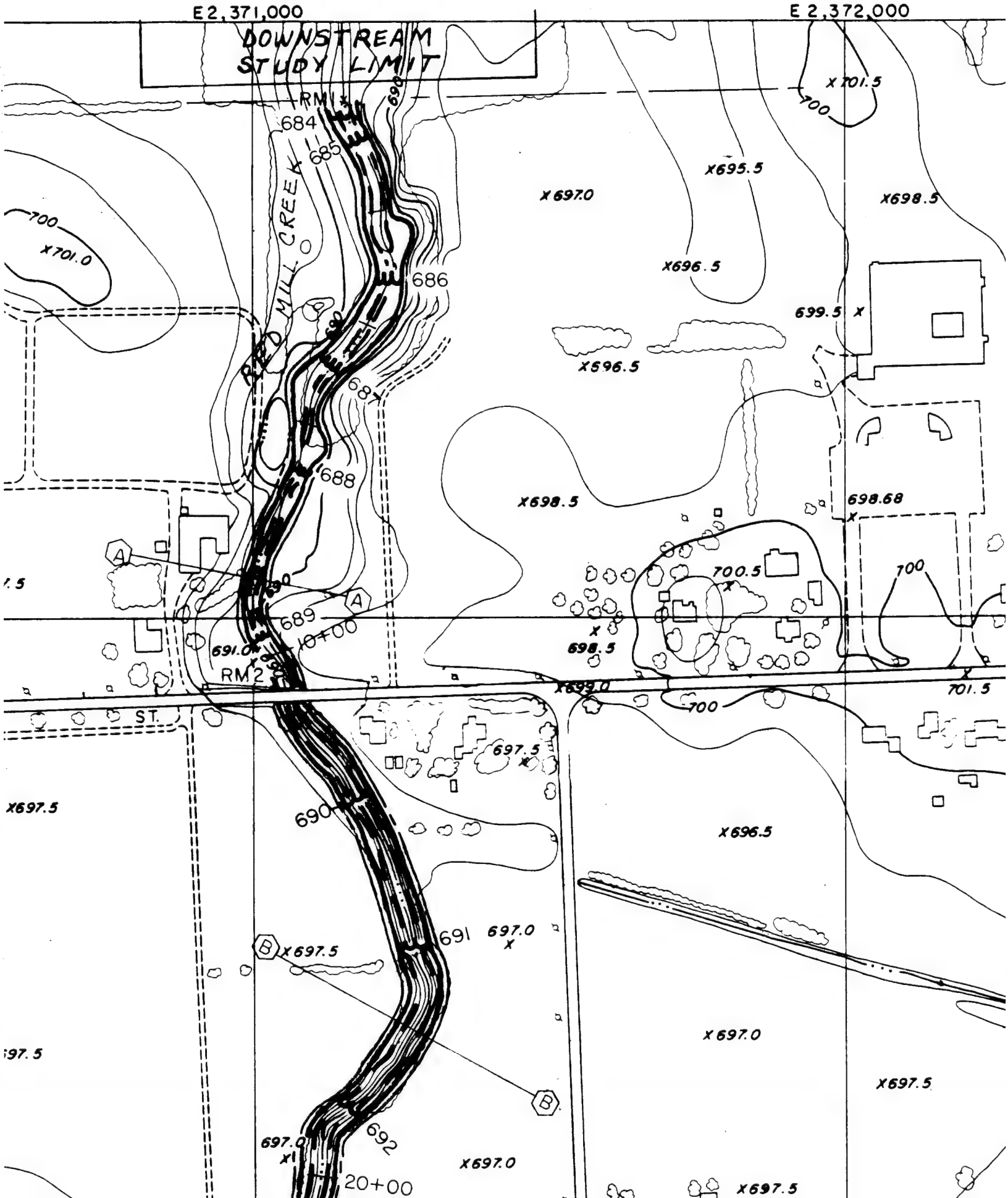
MAP

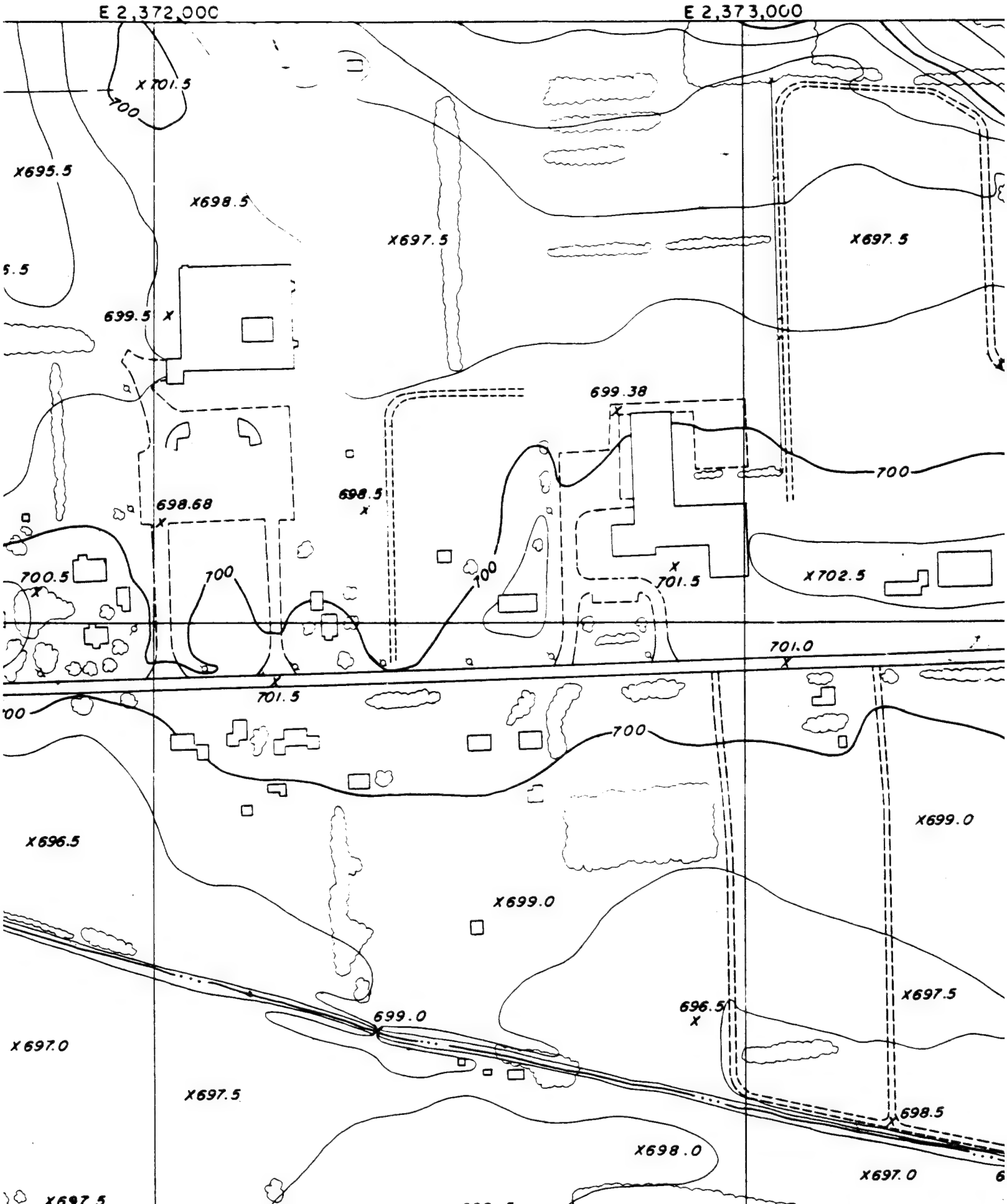
RY, OHIO

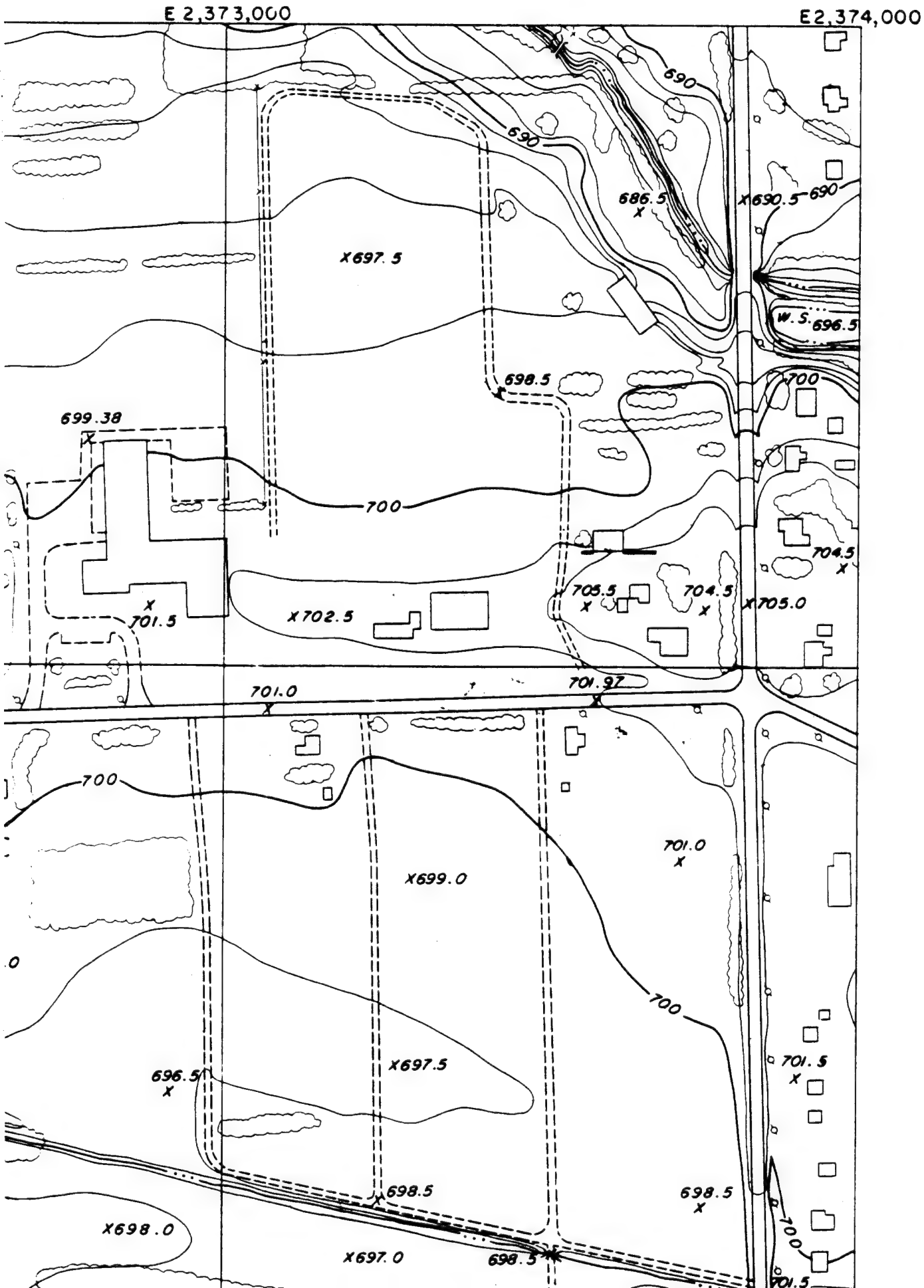

E 2,367,000
E 2,368,000
N770,000
N769,000
693.5
692.5
691.5
693.5
693.0
692.5
691.5
690
693.0
693.0
692
693.5
693.0
694.5
695.0
700
697.82
702.5
702.5
701.0
700
697.0
697.5
695.5

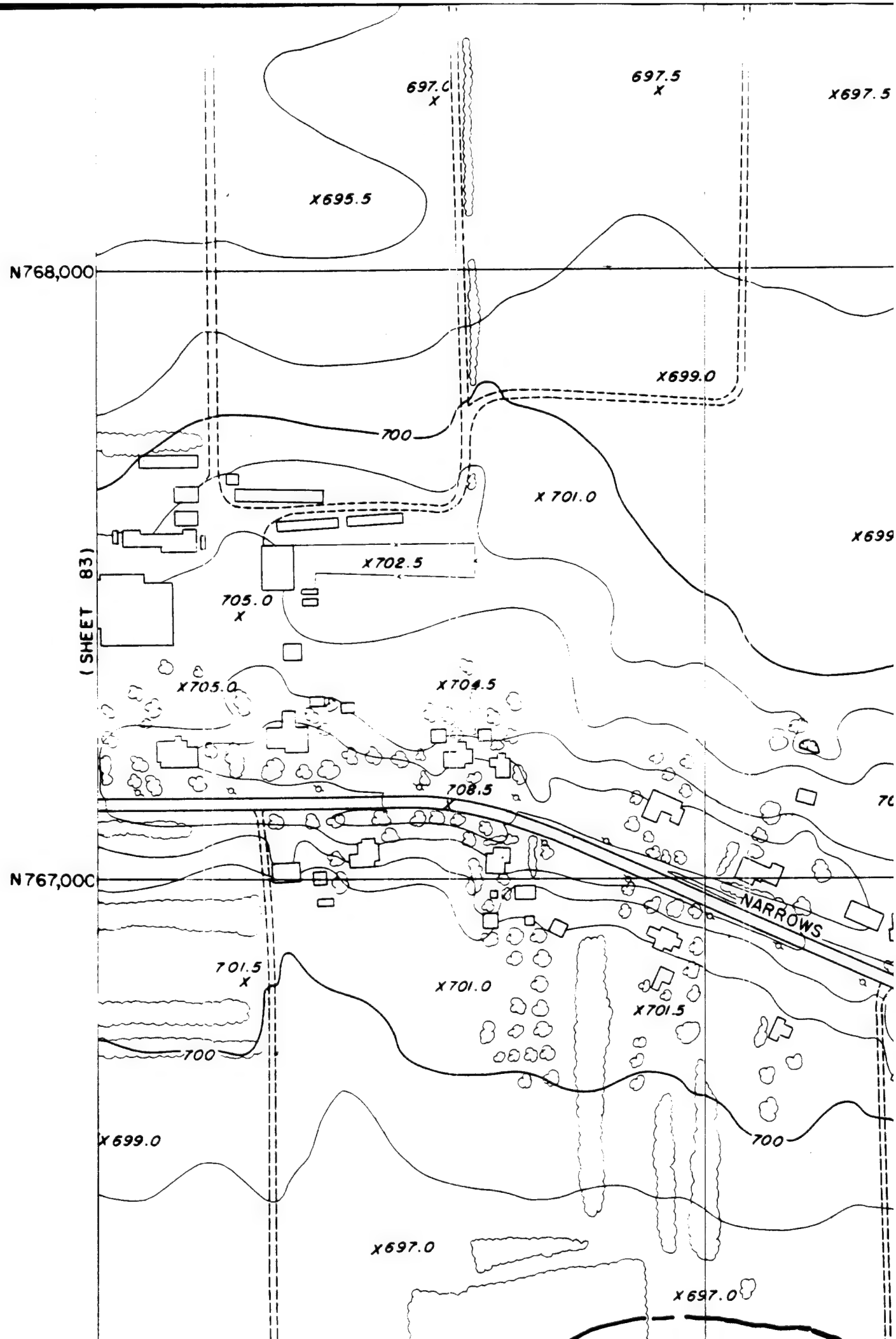

368,000
E 2,369,000
693.0
695.0
694.5
692.5
697.0
695 0
693.5
693.0
695.0
693.5
695.5
696.5
695.0
696.5
696.5
695.0
697.5
699.0
699.86
700
700.55
700
700.5
700.5
702.5
703.5
701.0
701.5
700
700
700
700.5
697.5
697.5
698.5
700

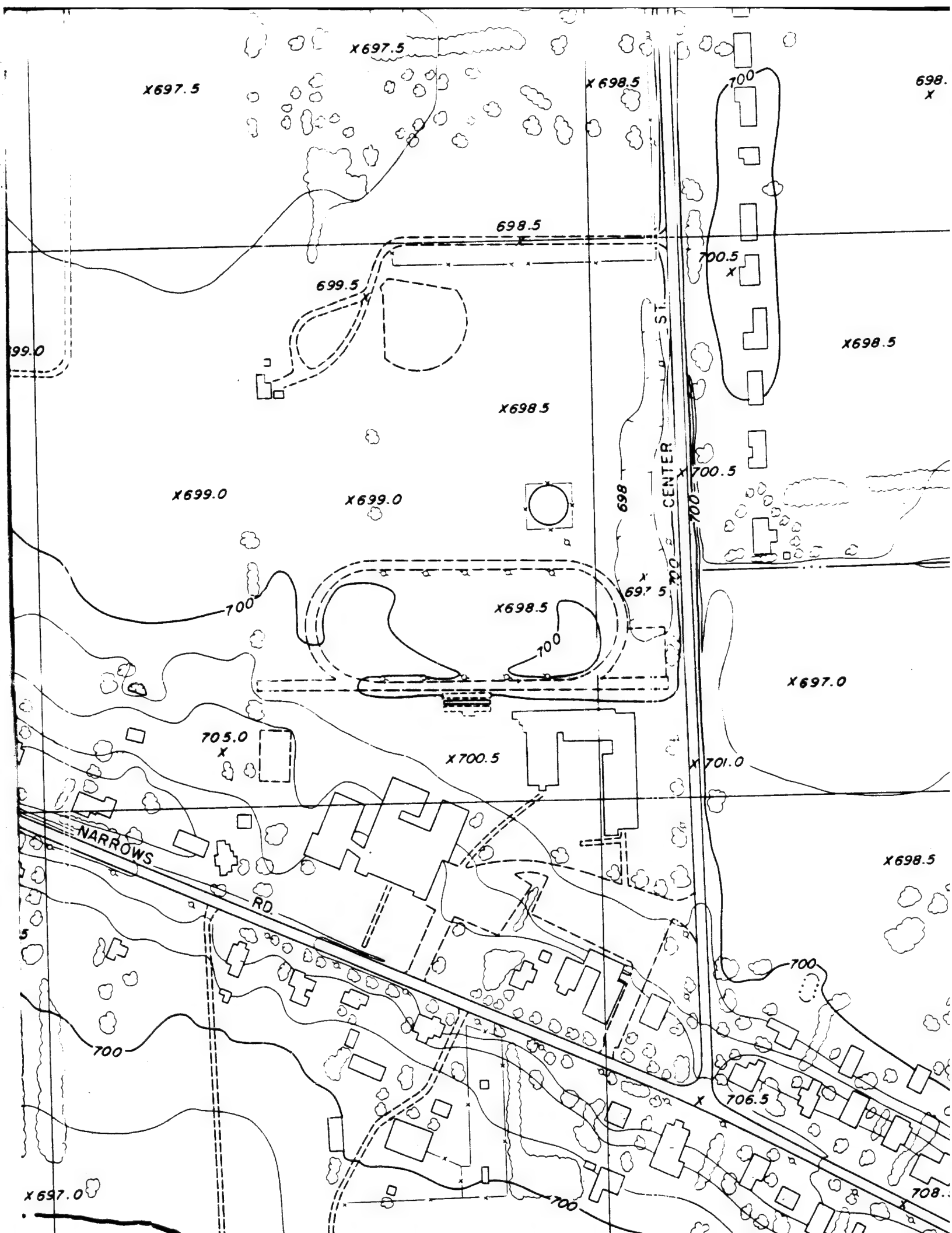

E 2,370,000
(SHEET 63)
E 2,371,0
X699.5
700.5
X
700
X701.0
X696.5
X697.5
X697.0
X696.5
X696.5
X699.5
X698.5
X69 1.5
A
691.0
RM2
699.25
X
MANCHESTER ST.
X697.5
X701.5
700
698.5
X
X698.5
X697.5
B

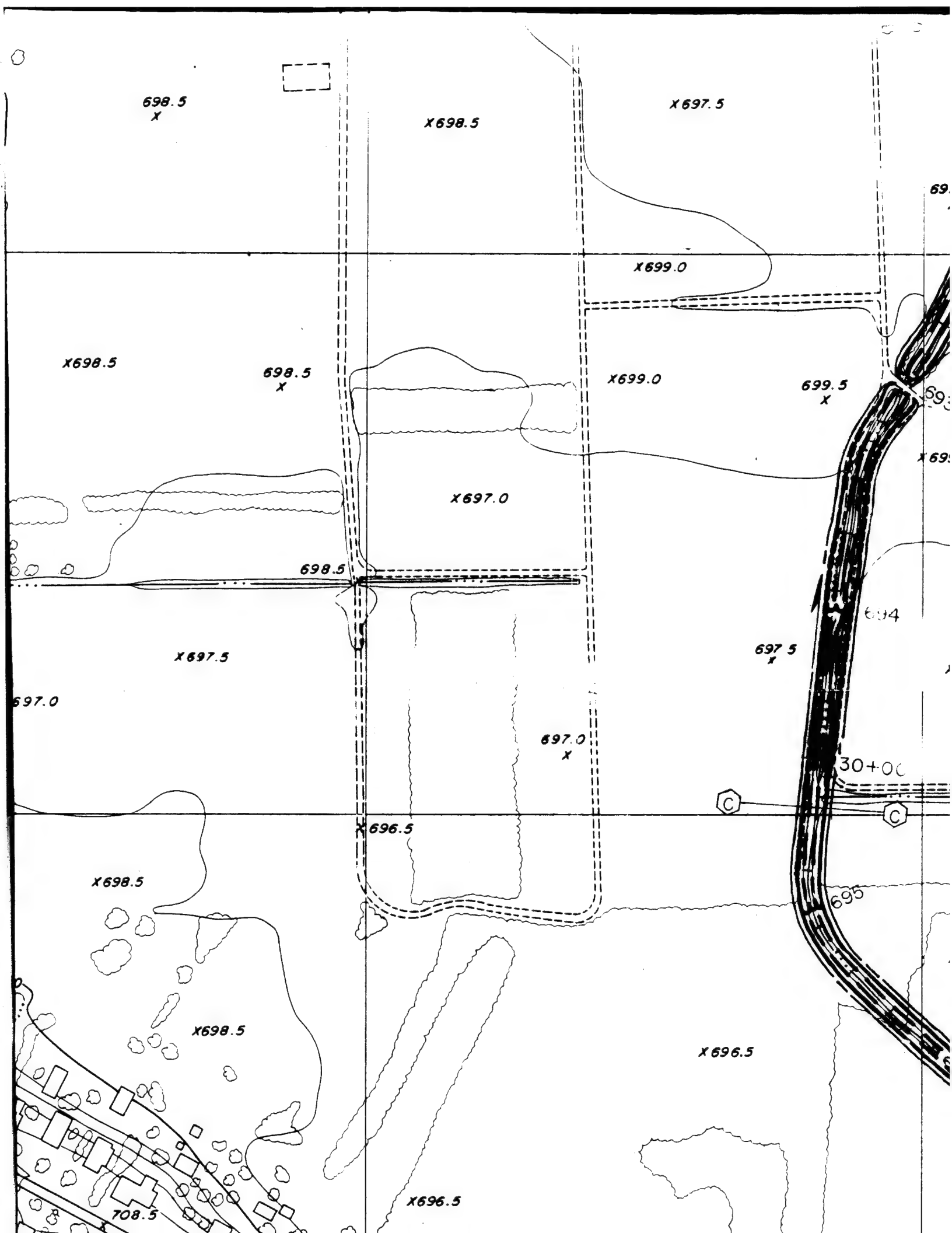

E 2,371,000
E 2,372,000
DOWNSTREAM STUDY LIMIT
RM1
RM2
BIG MILL CREEK
684
685
686
688
689
690
691
692
700
701.0
701.5
X701.5
X695.5
X697.0
X698.5
X696.5
699.5 X
X596.5
698.68
700.5
X698.5
X699.0
697.5
X697.5
X696.5
697.0
X697.0
X697.5
691.0
10+00
20+00
A
B
ST.

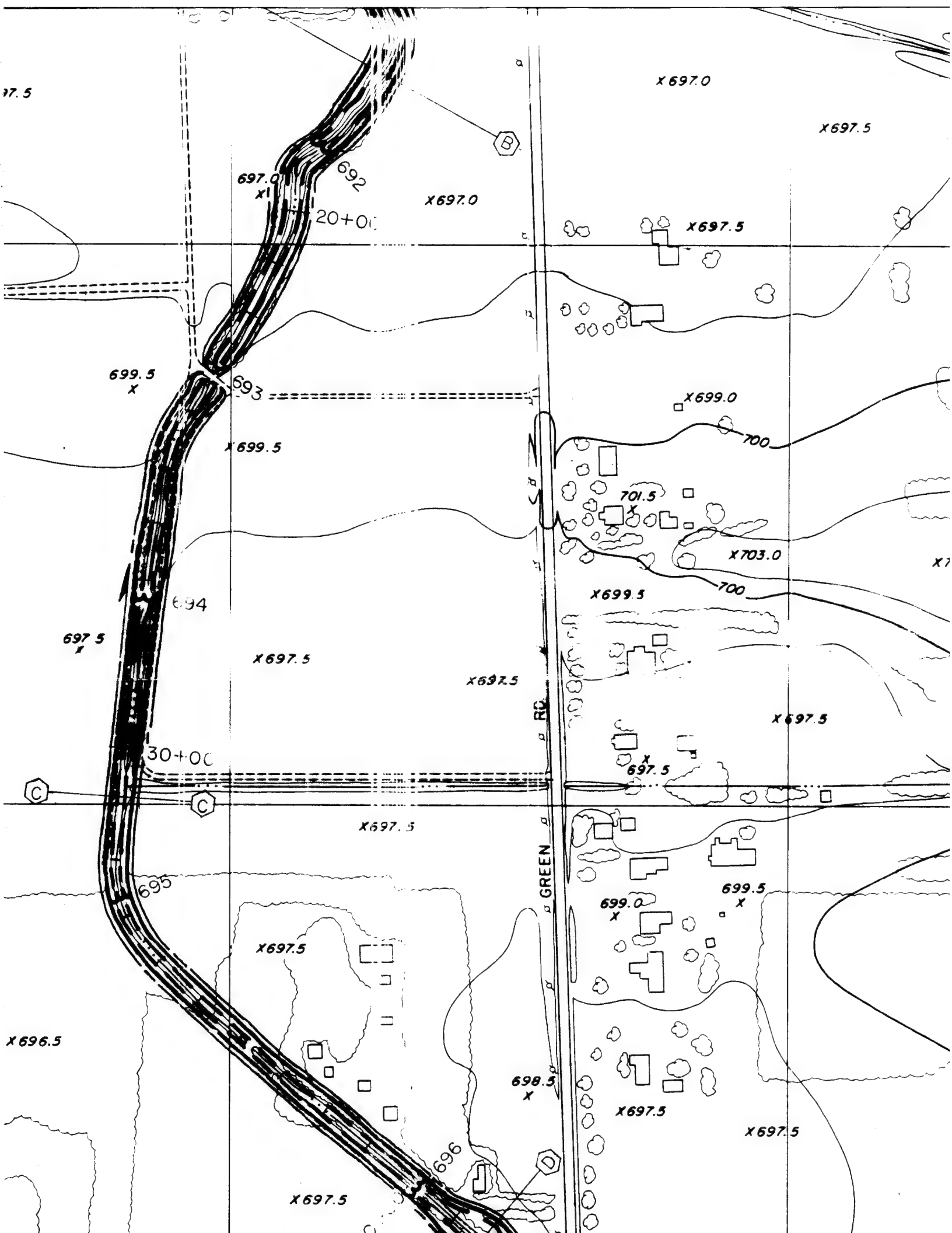

E 2,372,000
E 2,373,000
X701.5
700
X695.5
X698.5
X697.5
X697.5
699.5 X
699.38
700
698.68
698.5
700.5
700
700
701.5
X702.5
701.0
701.5
700
X696.5
X699.0
X699.0
X697.5
696.5
X697.0
699.0
X697.5
698.5
X698.0
X697.0

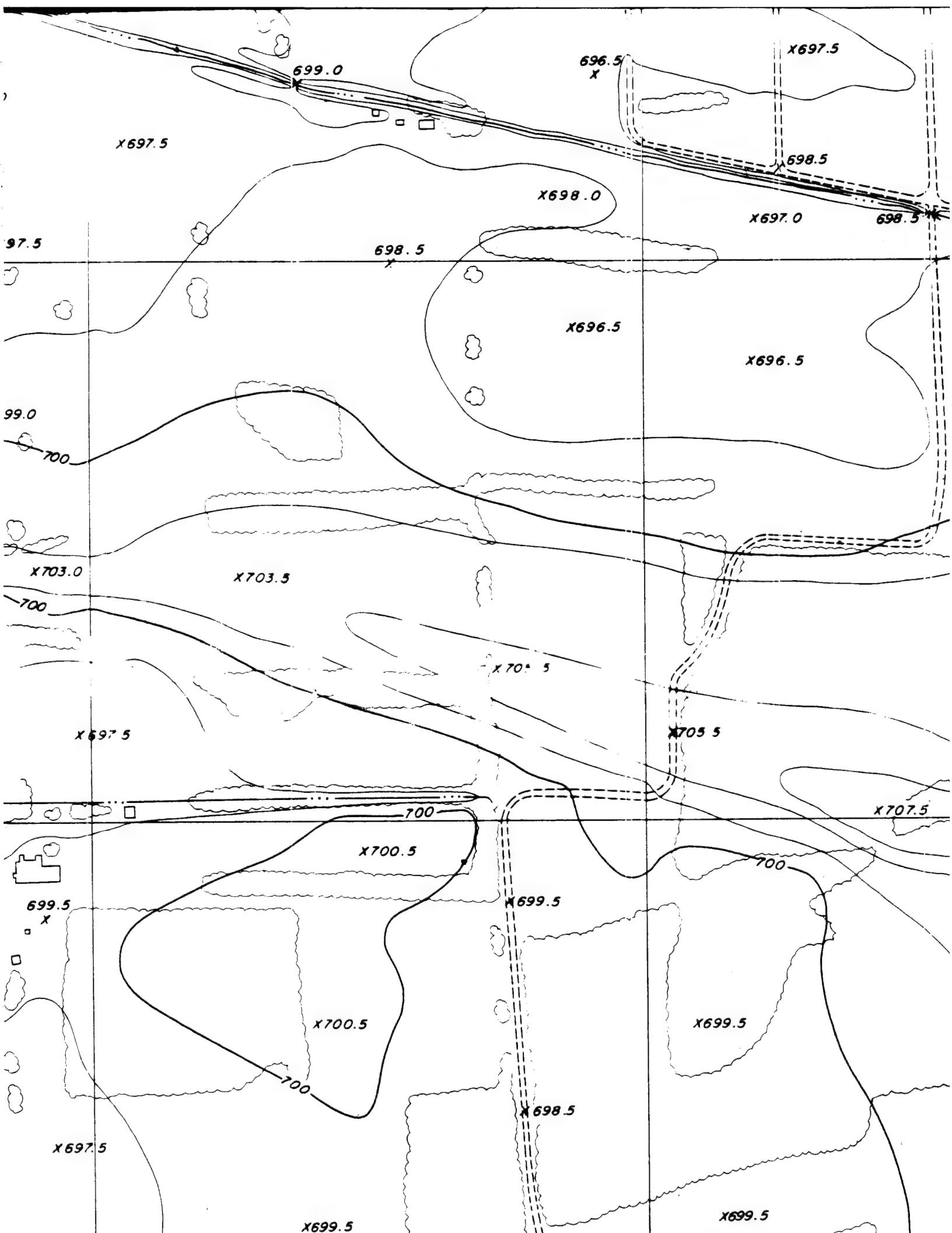

E 2,373,000
E2,374,000
690
690
686.5
690.5
690
X697.5
W.S. 696.5
698.5
700
699.38
700
704.5
705.5
704.5
705.0
701.5
X702.5
701.0
701.97
700
701.0
X699.0
700
696.5
X697.5
701.5
698.5
698.5
X698.0
X697.0
698.5
700
701.5

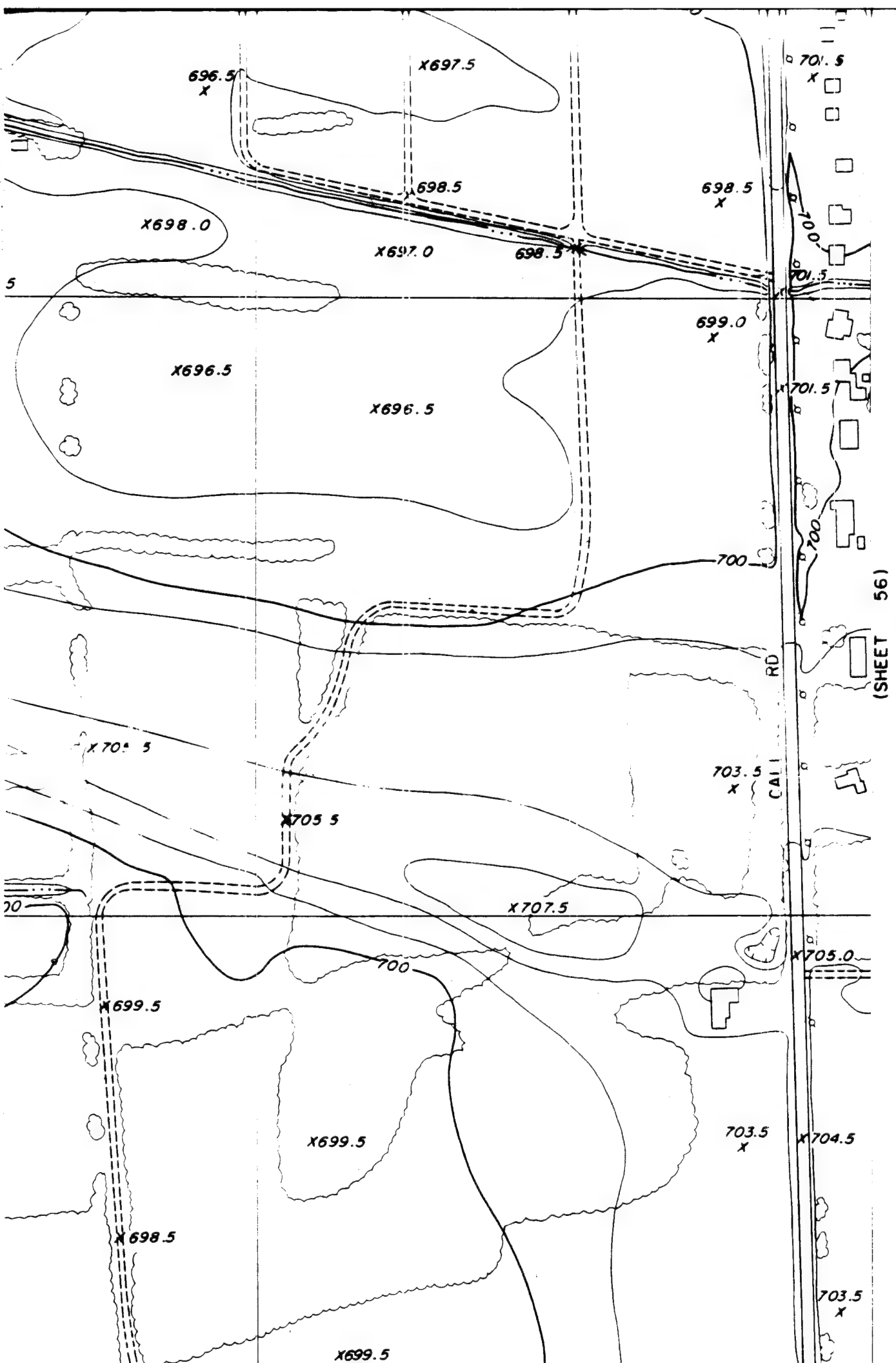

697.0
697.5
X697.5
X695.5
N768,000
X699.0
700
X 701.0
X699
X702.5
705.0
(SHEET 83)
X705.0
X704.5
708.5
N767,000
NARROWS
701.5
X701.0
X701.5
700
X699.0
700
X697.0
X697.0

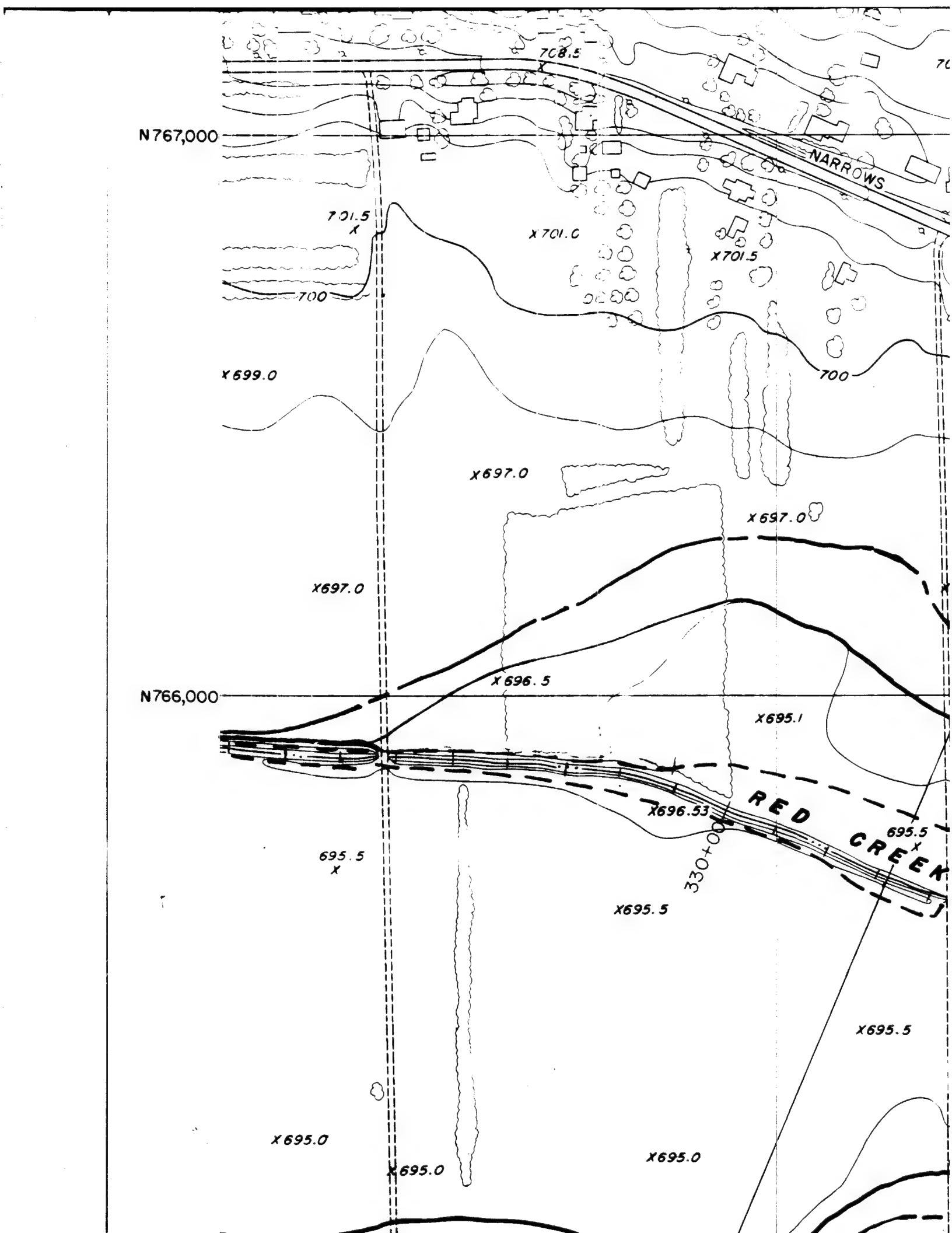

X697.5
X697.5
X698.5
700
698.5
700.5
699.5
X698.5
X698.5
X699.0
X699.0
CENTER ST.
698
700
X700.5
700
X698.5
700
X697.0
705.0
X700.5
X701.0
NARROWS RD.
X698.5
700
700
X706.5
X697.0
700

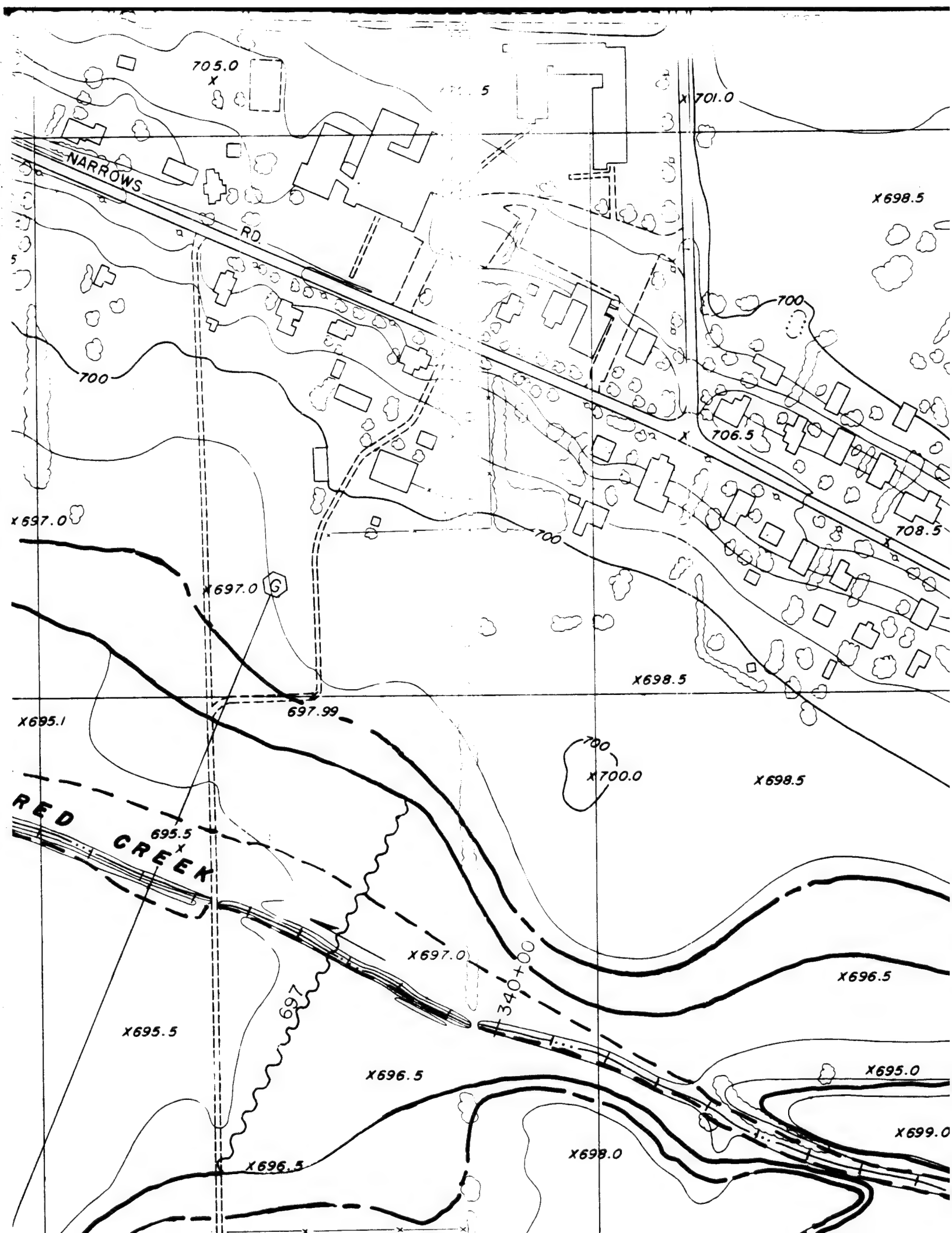

698.5
X697.5
X698.5
X699.0
X698.5
698.5
X699.0
699.5
X697.0
698.5
X697.5
697.5
697.0
697.0
30+00
X696.5
X698.5
695
X698.5
X696.5
708.5
X696.5

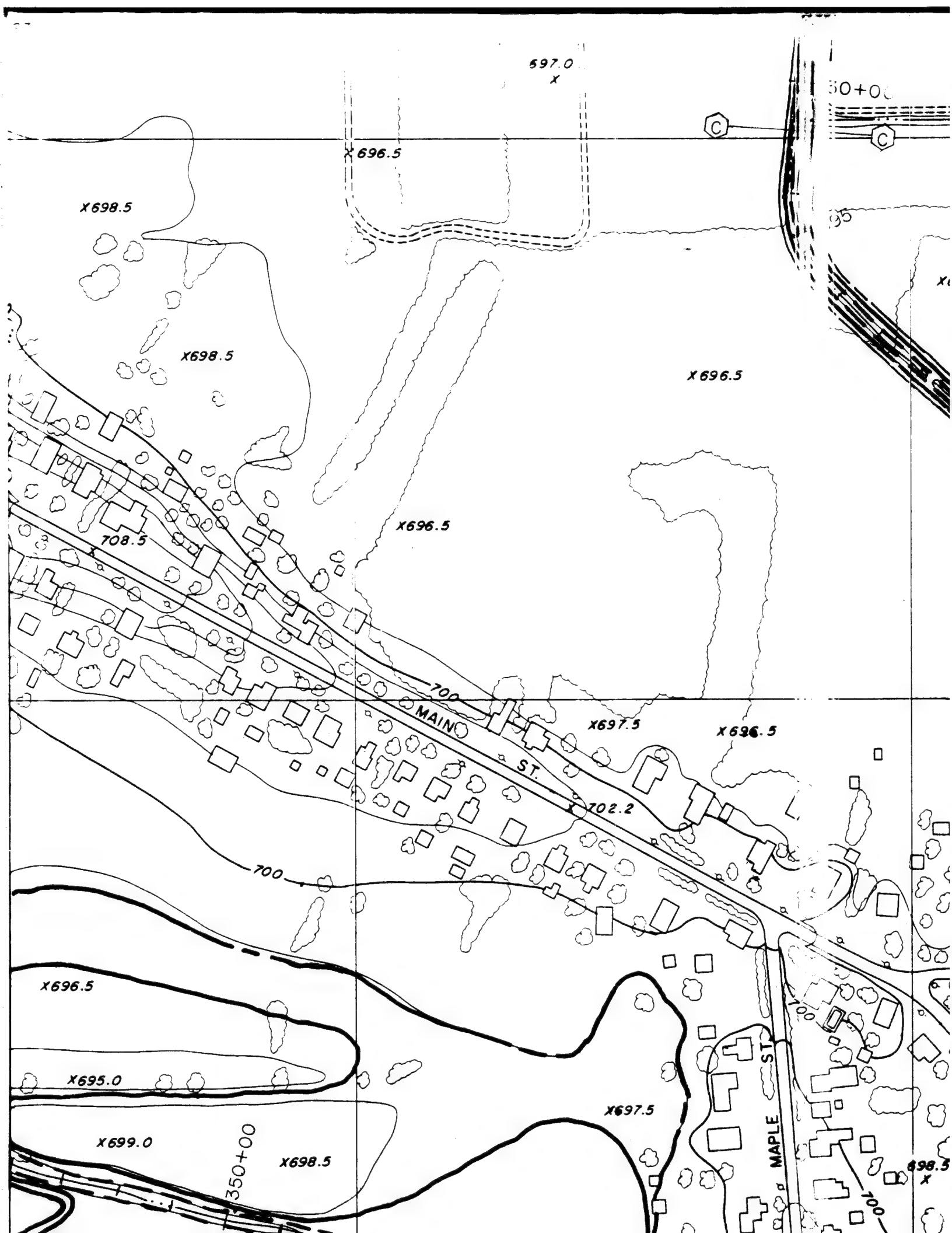

697.5
697.0
X697.5
697.0
X
692
20+00
X697.0
X697.5
699.5
X
693
X699.0
700
X699.5
701.5
X
X703.0
700
694
X699.5
697.5
X
X697.5
X697.5
RD.
X697.5
30+00
697.5
X
C
C
X697.5
GREEN
695
699.5
X
699.0
X
X697.5
X696.5
698.5
X
X697.5
X697.5
696
X697.5

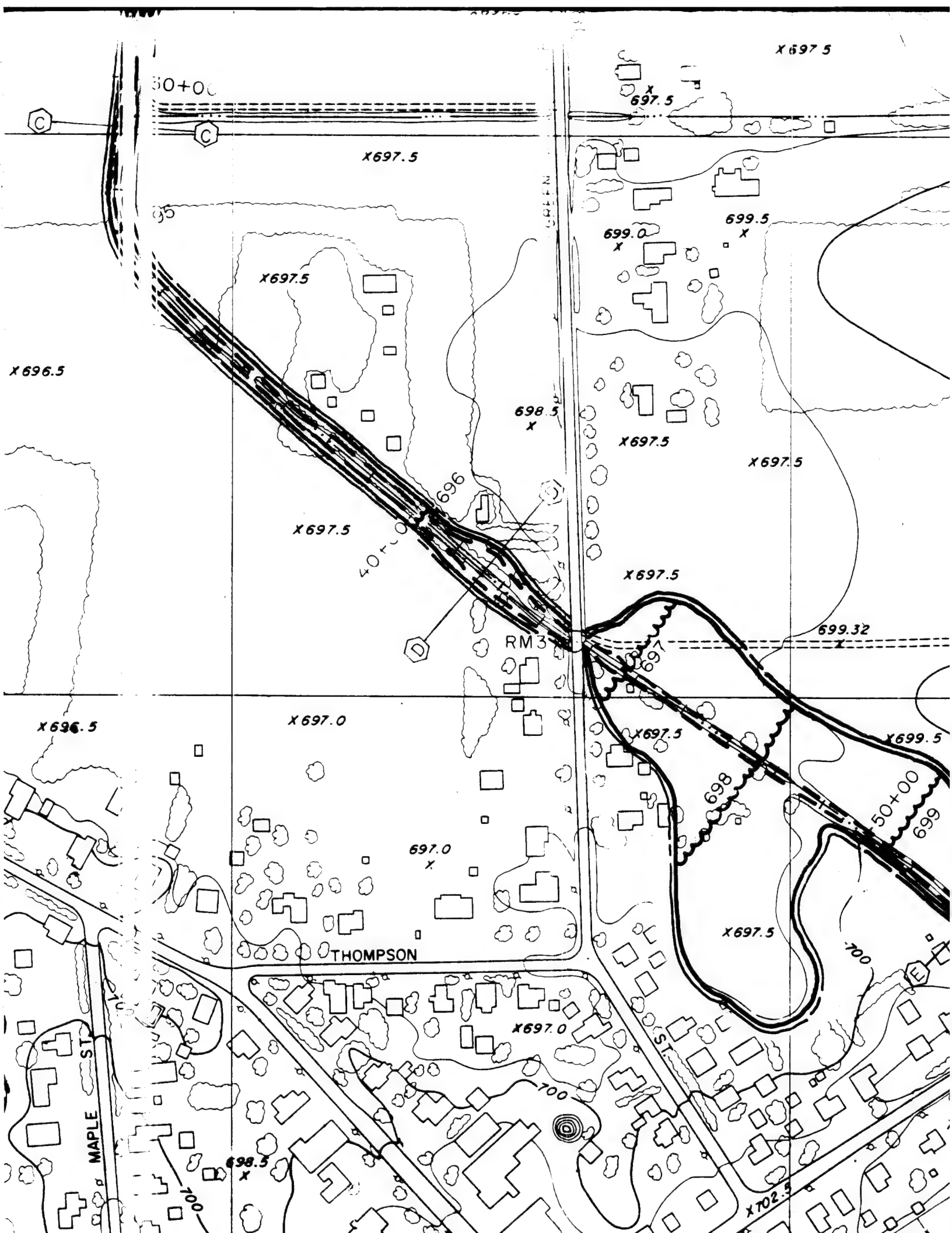

699.0
696.5
X697.5
X697.5
698.5
X698.0
X697.0
698.5
97.5
698.5
X696.5
X696.5
99.0
700
X703.0
X703.5
700
X70* 5
X697 5
X705 5
700
X707.5
X700.5
700
699.5
699.5
X700.5
X699.5
700
698.5
X697.5
X699.5
X699.5

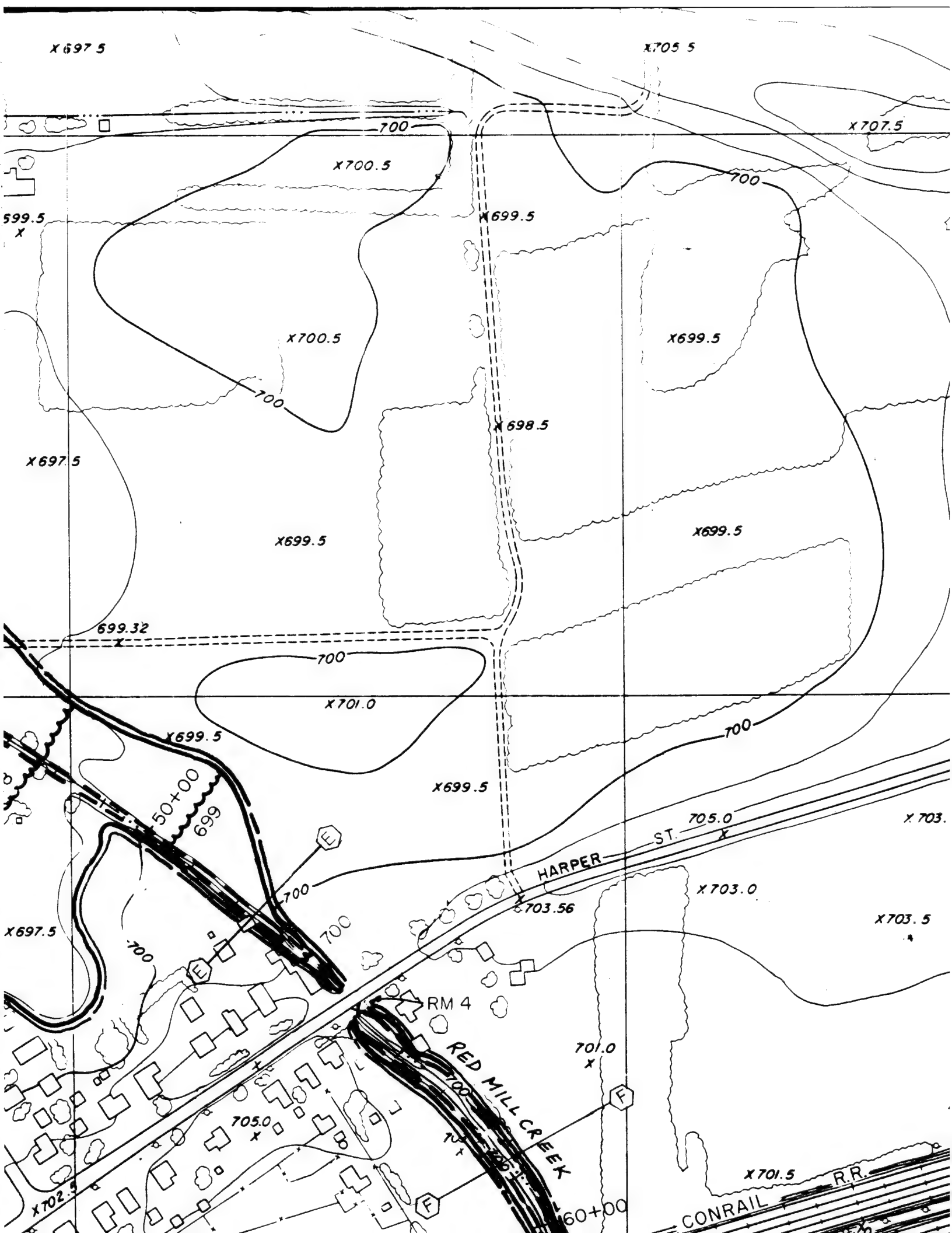

696.5
X697.5
701.5
698.5
698.5
X698.0
X697.0
698.5
699.0
X696.5
X696.5
X701.5
700
700
700
RD
(SHEET 56)
703.5
CAL
X705.5
X707.5
X705.0
700
X699.5
X699.5
703.5
X704.5
X698.5
703.5
X699.5

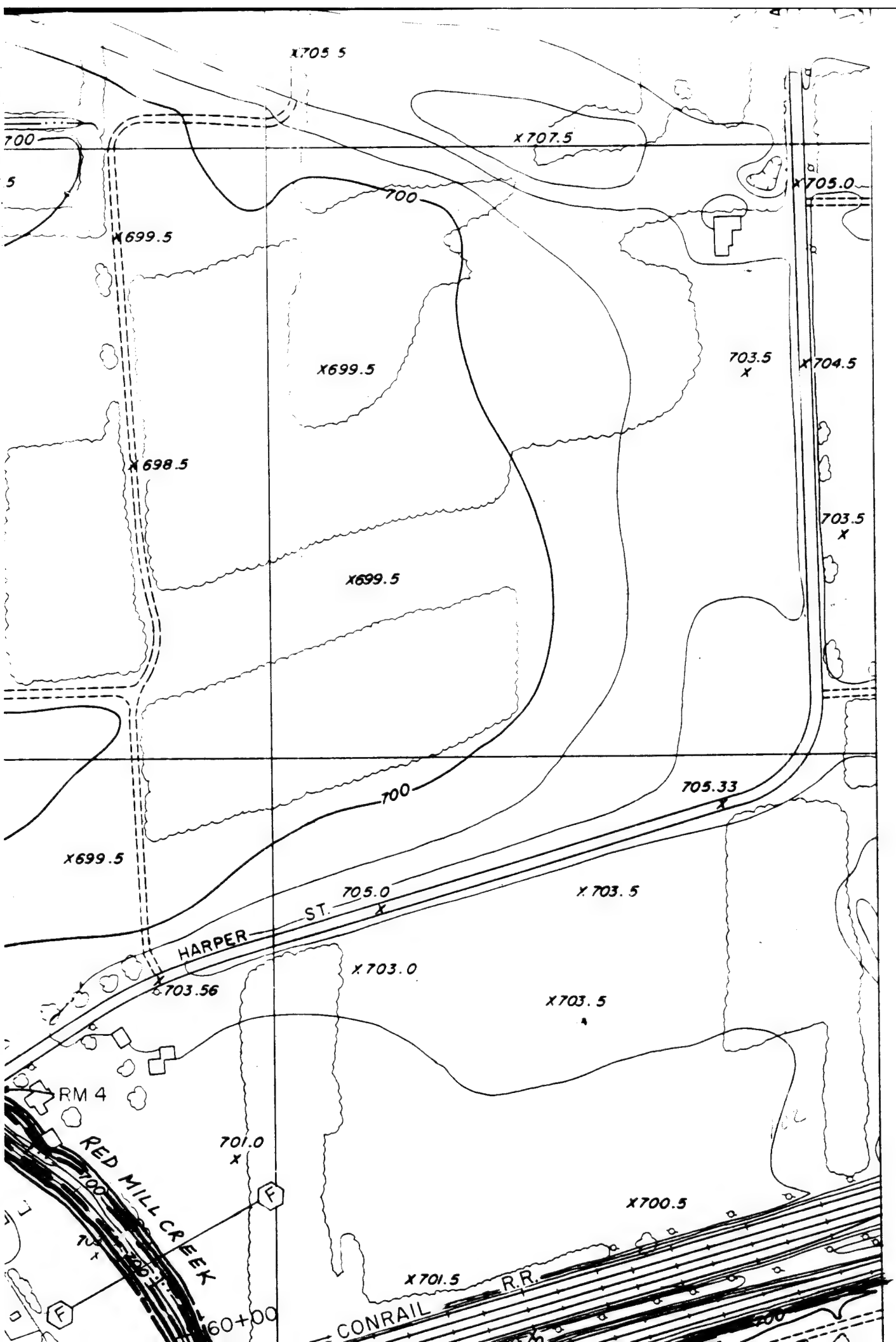

N767,000
N766,000
708.5
NARROWS
701.5
701.0
701.5
700
700
699.0
697.0
697.0
697.0
696.5
695.1
696.53
330+00
RED
CREEK
695.5
695.5
695.5
695.5
695.0
695.0
695.0

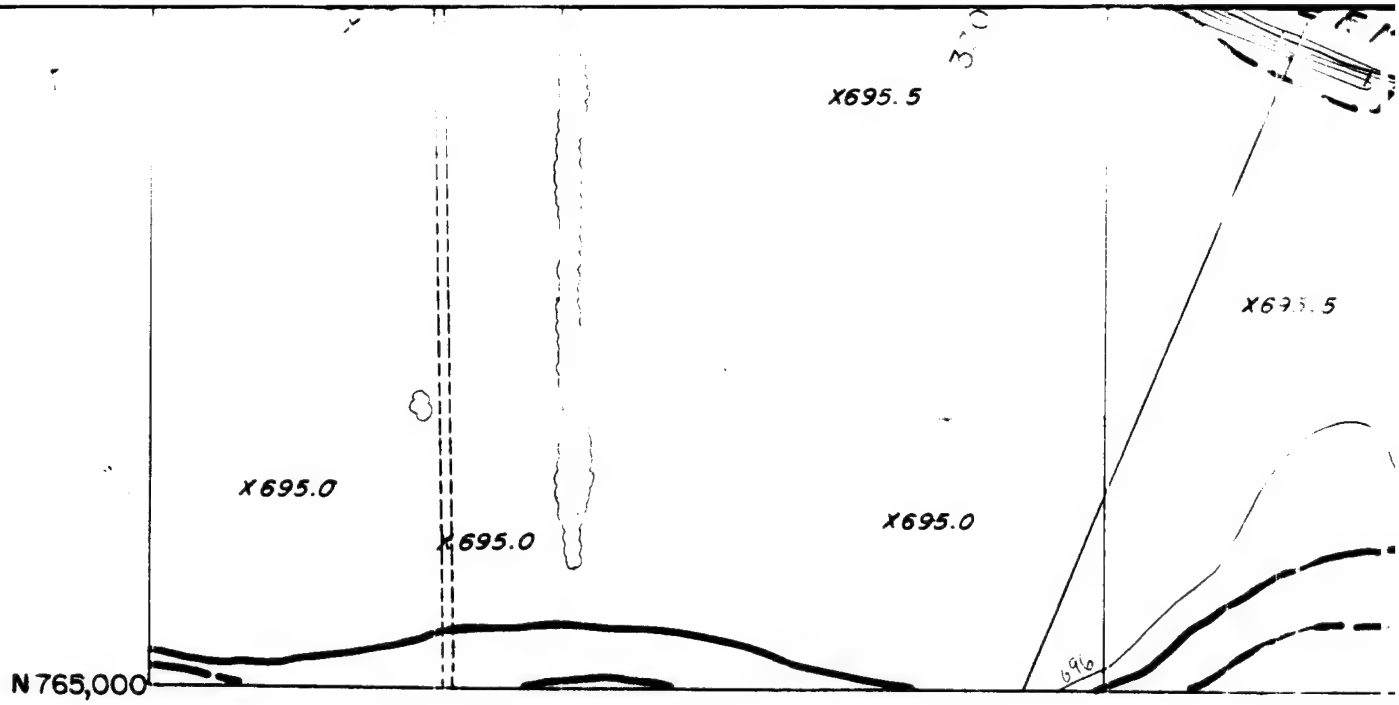

705.0
NARROWS
RD.
701.0
698.5
700
706.5
708.5
697.0
697.0
G
700
698.5
695.1
697.99
700
700.0
698.5
RED
CREEK
695.5
697.0
340+00
697
696.5
695.5
696.5
695.0
699.0
698.0
696.5


597.0
X696.5
X698.5
X698.5
X696.5
X696.5
708.5
700
MAIN ST.
X697.5
X696.5
702.2
700
X696.5
X695.0
X699.0
350+00
X698.5
X697.5
MAPLE ST.
100
100
698.5


X697.5
697.5
X697.5
699.5
699.0
X697.5
X696.5
698.5
X697.5
X697.5
X697.5
X697.5
RM3
699.32
X696.5
X697.0
X697.5
X699.5
698
50+00
699
697.0
X697.5
THOMPSON
X697.0
700
MAPLE ST.
698.5
X702.5


X697.5
X705.5
700
X707.5
X700.5
599.5
X699.5
X700.5
X699.5
700
X698.5
X697.5
X699.5
X699.5
699.32
700
X701.0
X699.5
700
X699.5
50+00
699
E
705.0
HARPER ST.
X703.
700
X703.56
X703.0
X703.5
X697.5
700
700
E
RM 4
RED MILL CREEK
701.0
700
705.0
F
X701.5
R.R.
X702.5
F
60+00
CONRAIL


705 5
700
707.5
705.0
699.5
700
699.5
703.5
704.5
698.5
703.5
699.5
700
705.33
699.5
705.0
HARPER ST.
703.56
703.0
703.5
703.5
RM 4
701.0
RED MILL CREEK
700
700.5
701.5
R.R.
CONRAIL
60+00
700



OHIO COORDINATE SYSTEM
LAMBERT GRID

ELEVATIONS ARE BASED ON
MEAN SEA LEVEL 1927
NORTH AMERICAN DATUM

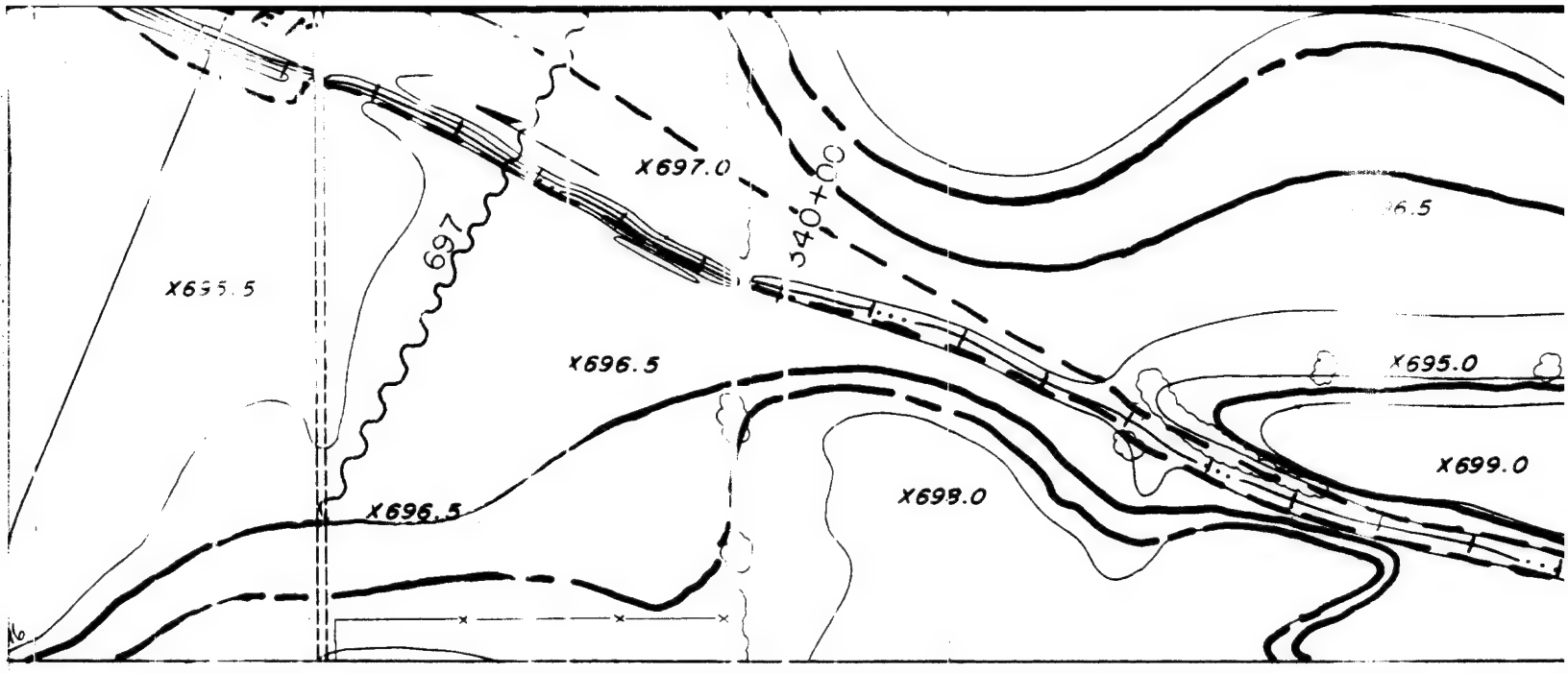
PREPARED BY:
KUCERA & ASSOCIATES INC.
PHOTOGRAMMETRIC ENGINEERS
MENTOR, OHIO

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS

A

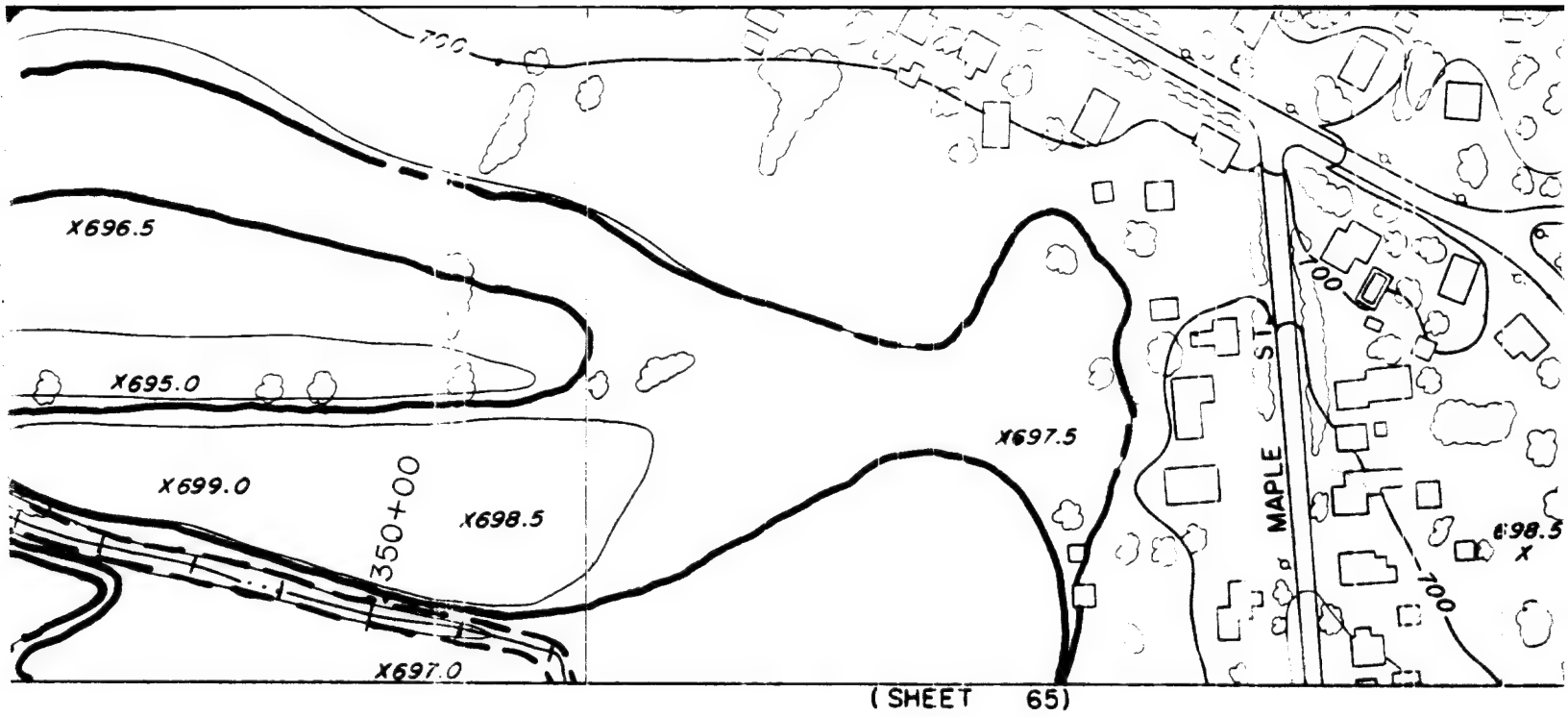
RM1 X

650



LEGEND

- 100 YEAR FLOOD LIMITS
- 500 YEAR FLOOD LIMITS
- FLOODWAY LIMITS
- (A)—(A) CROSS SECTION LOCATION
- RM1 X ELEVATION REFERENCE MARK
- HYDRAULIC BASELINE
- 650 BASE FLOOD ELEVATION

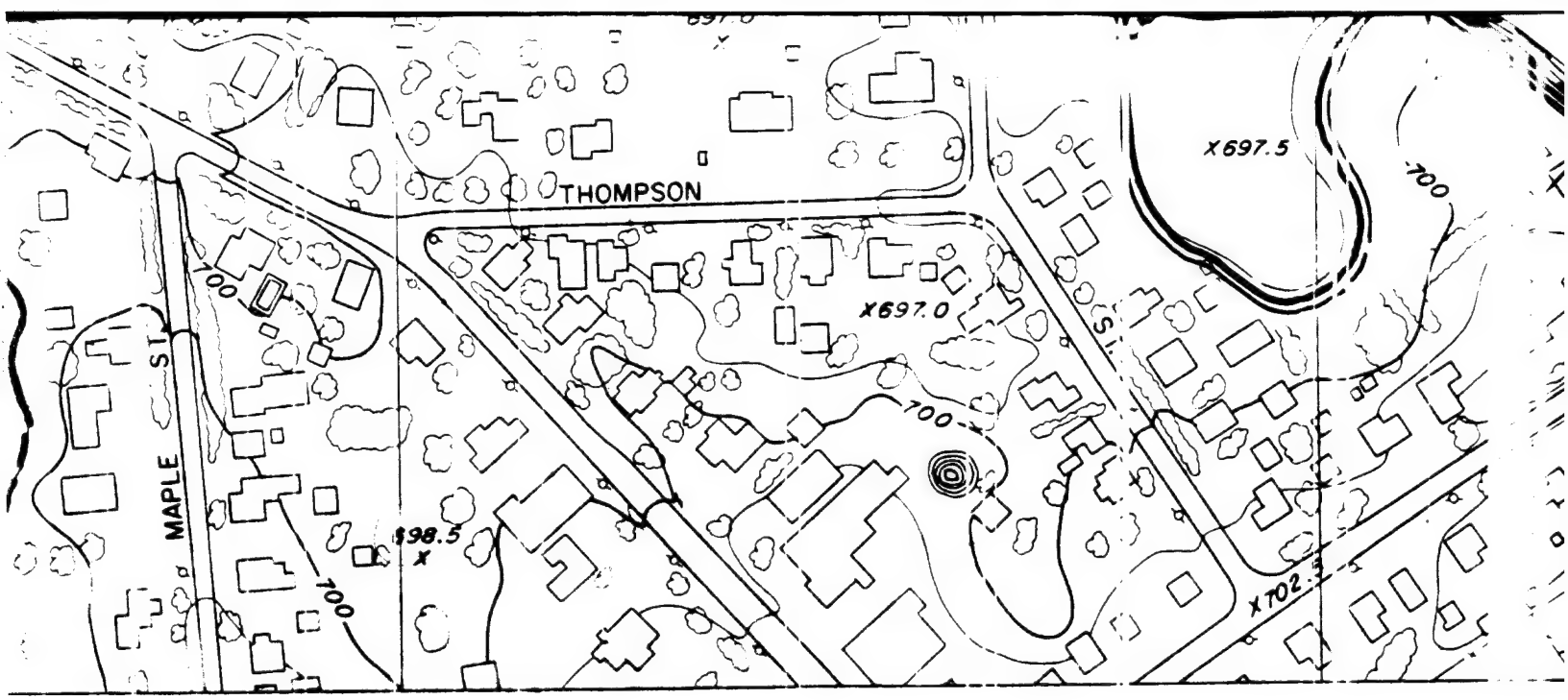


200 100 0 200 400 600 FEET

SCALE: 1"= 200' CONTOUR INTERVAL: 2'

DATE OF PHOTOGRAPHY

NOVEMBER, 1966 - JANUARY 1967



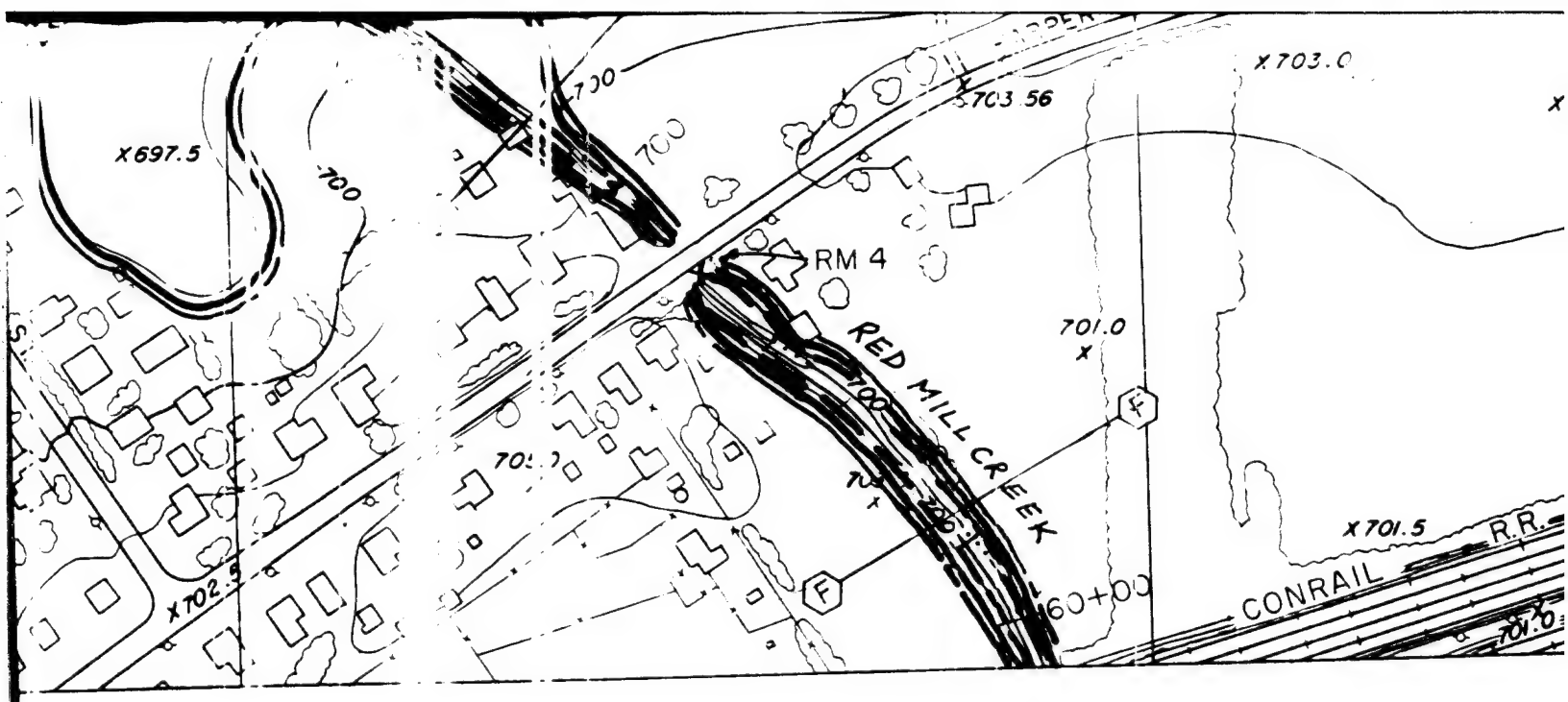
N

400 600 FEET

CONTOUR INTERVAL: 2'

OGRAPHY
JANUARY 1967

RED CA
F
V L



N

	83	64	56
38	82	65	55

LAKE COU

TOPOGRA

PREPAR

BOARD OF LAKE CO

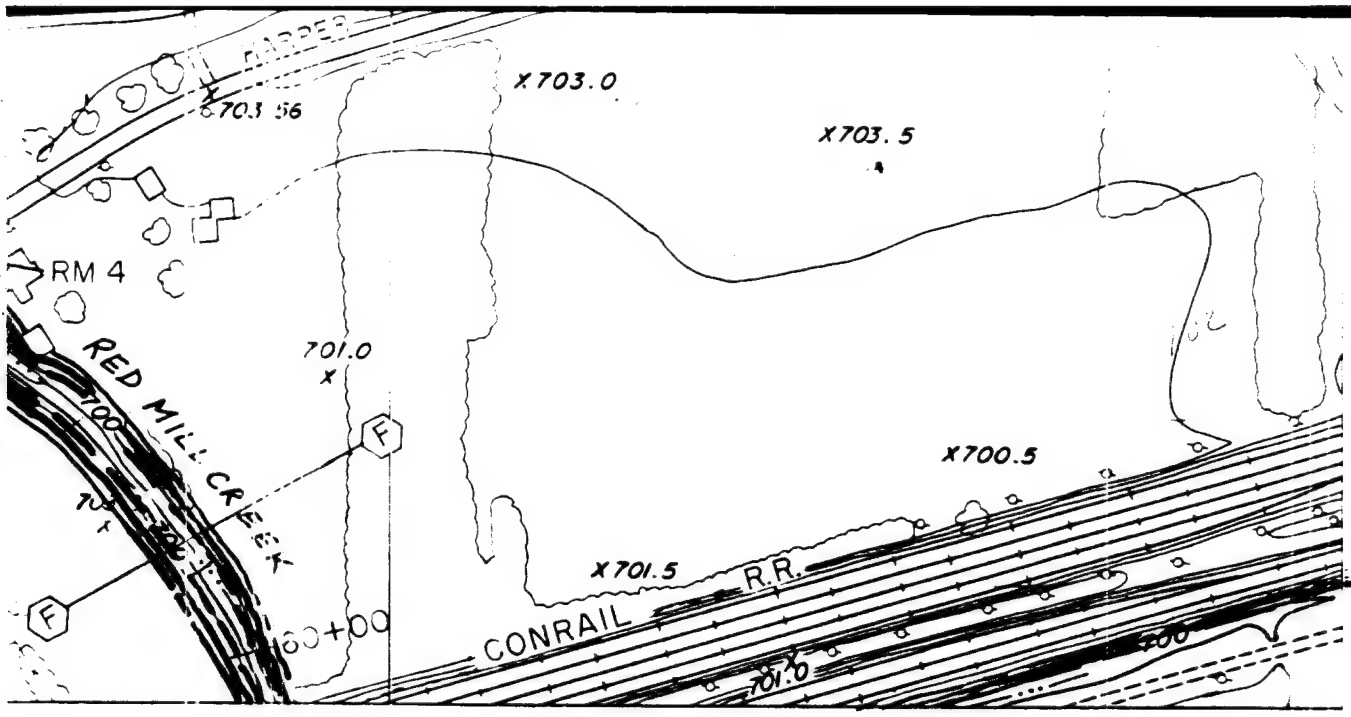
ROBERT B. FULT

JOHN D. HADDEN -

RED CREEK - RED MILL CREEK

FLOODED AREA MAP

VILLAGE OF PERRY, OHIO



LAKE COUNTY, OHIO

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSIONERS

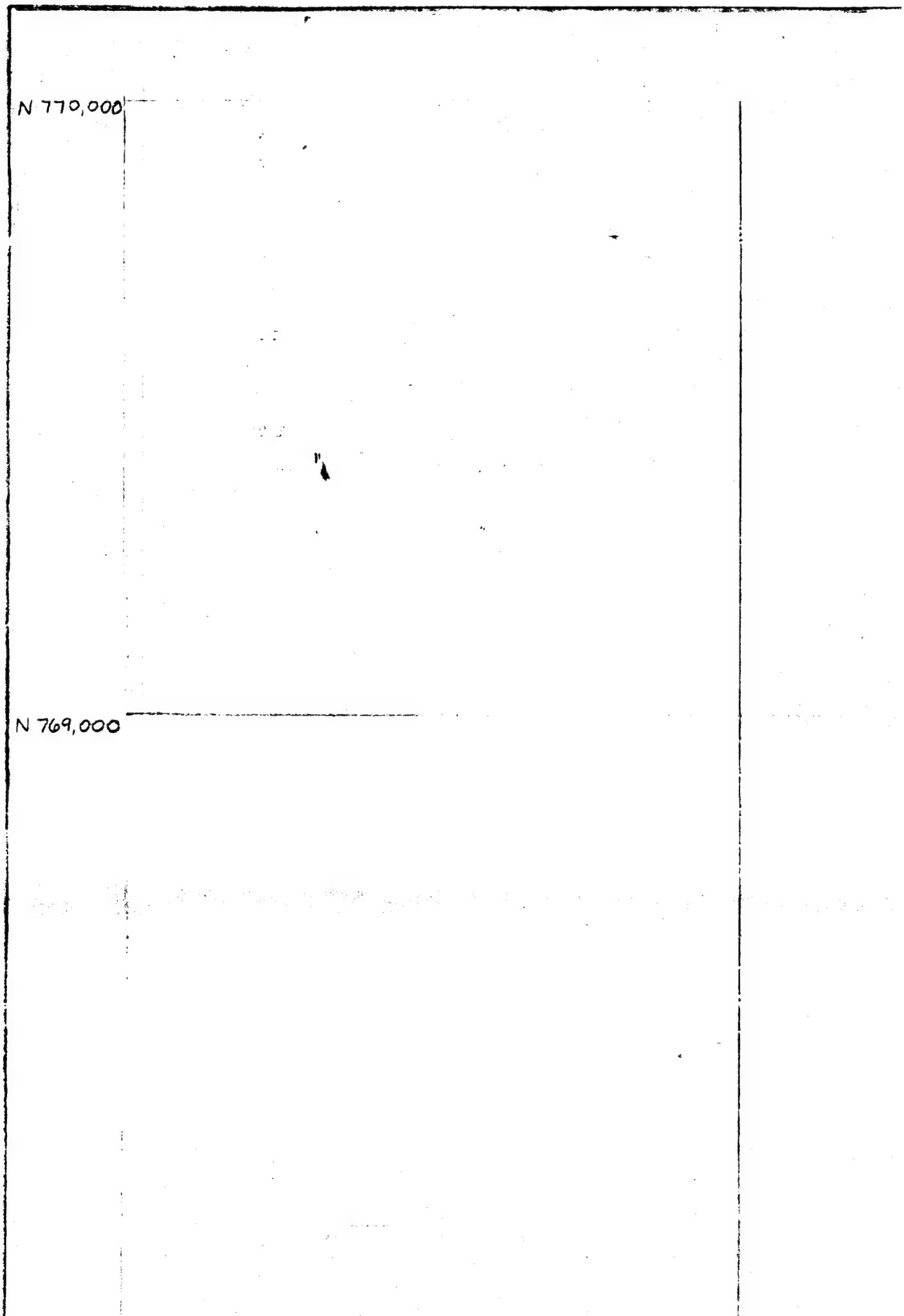
ROBERT B. FULTON, CHAIRMAN

JOHN D. HADDEN – HOWARD B. BEEBE

56
55

MILL CREEK
MAP
RY, OHIO

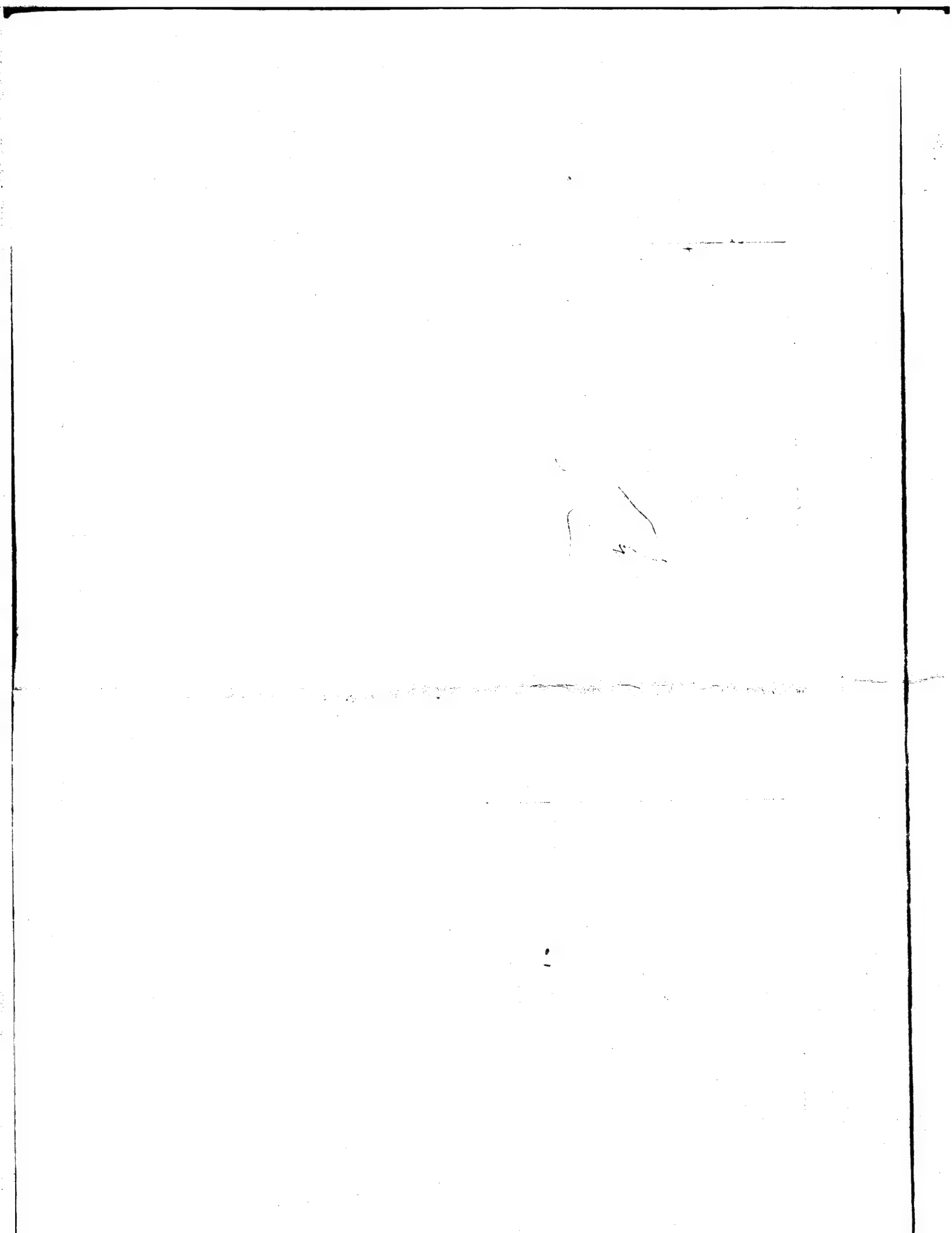
64

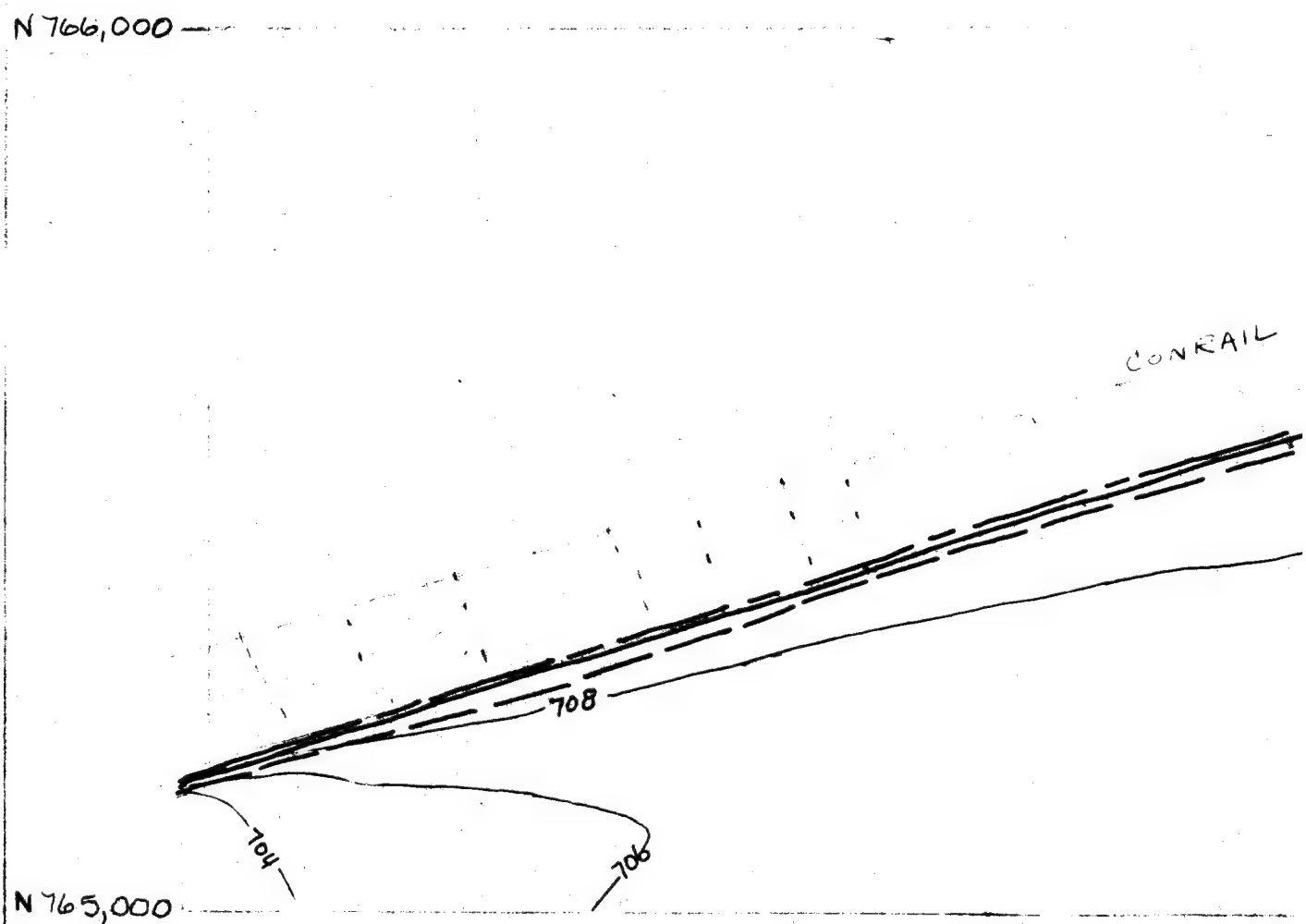

N 770,000
N 769,000

N 768,000

(MATCH SHEET 64)

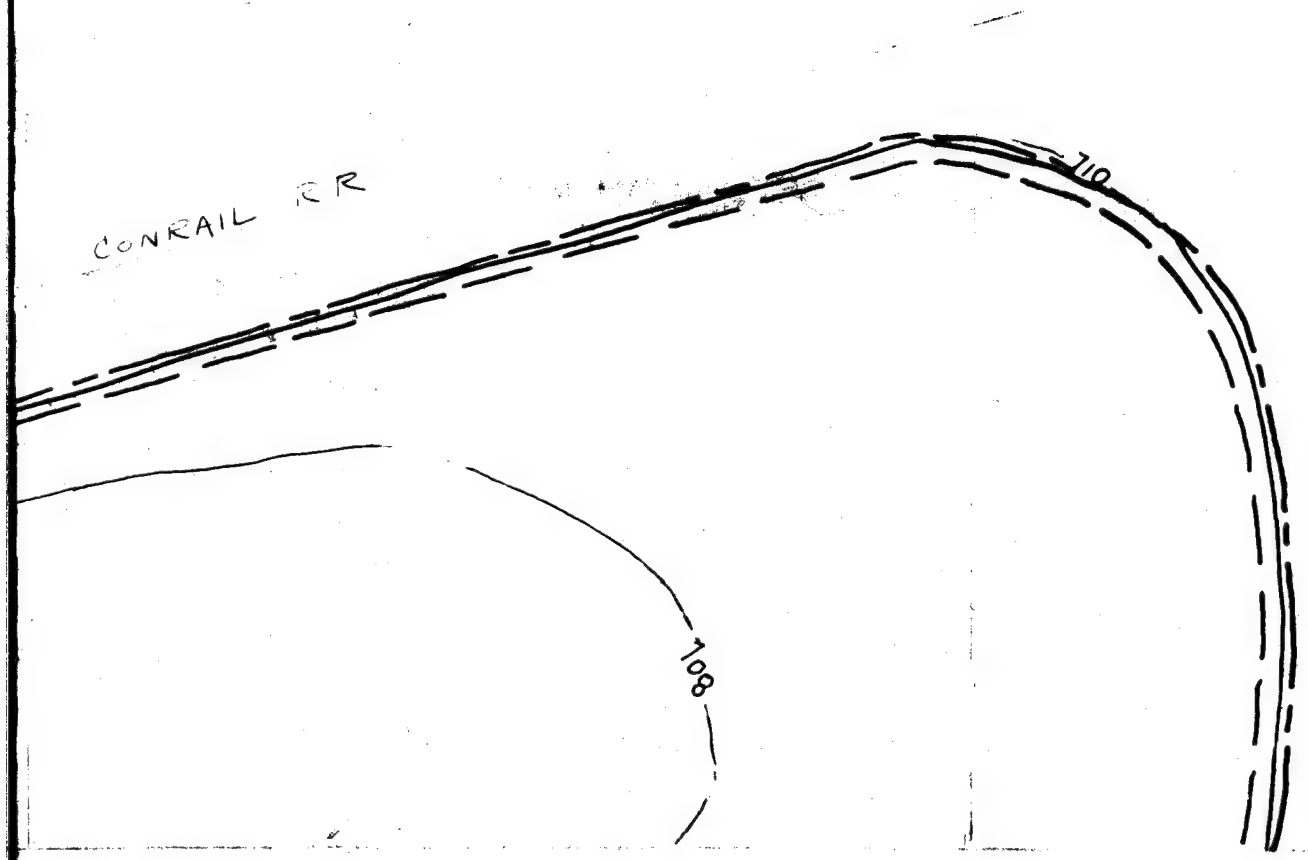
N 767,000





RMI >

650

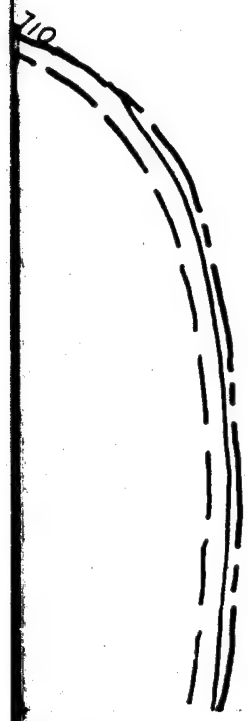


E 2,375,000

E 2,376,000

LEGEND

- 100 YEAR FLOOD LIMITS
- 500 YEAR FLOOD LIMITS
- FLOODWAY LIMITS
- CROSS SECTION LOCATION
- RM1 X ELEVATION REFERENCE MARK
- HYDRAULIC BASELINE
- 650 BASE FLOOD ELEVATION

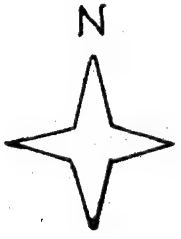


E 2,377,000

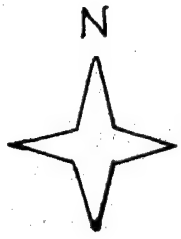
(MATCH SHEET 55)

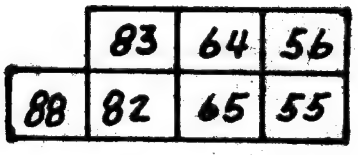
200 0

SCALE: 1" = 200'



RED





RED CREEK - RED MILL CREEK

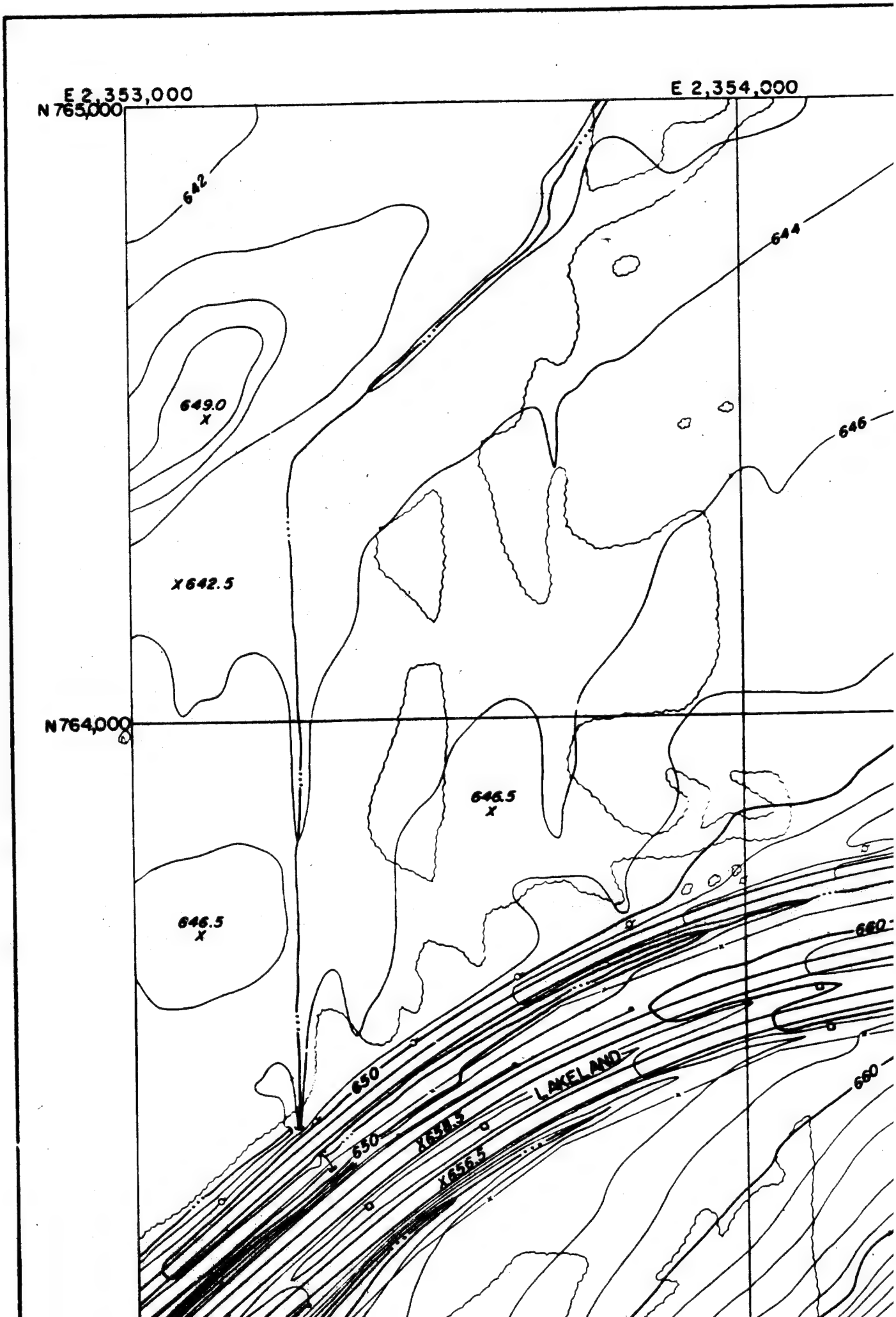
FLOODED AREA MAP

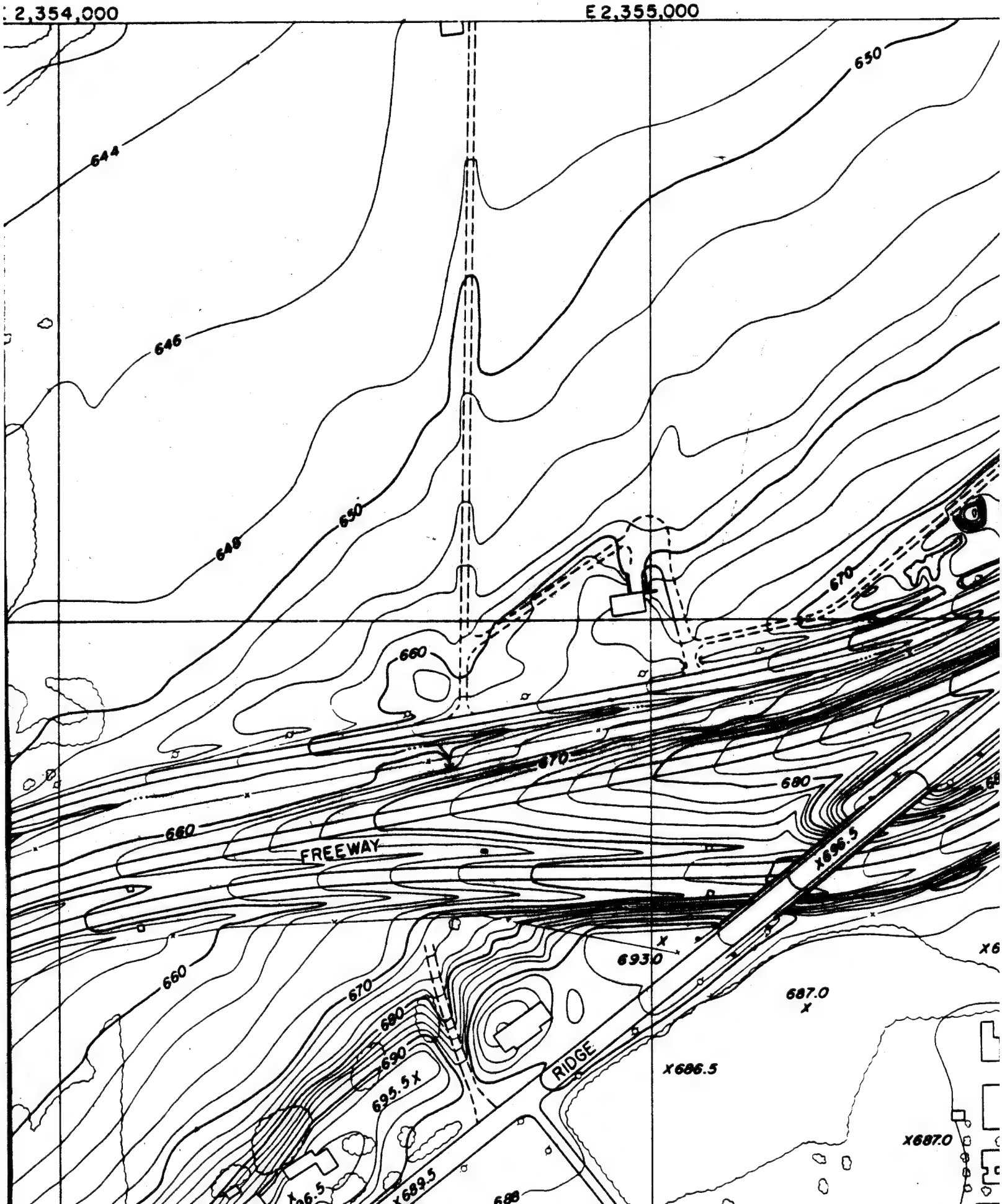
VILLAGE OF PERRY, OHIO

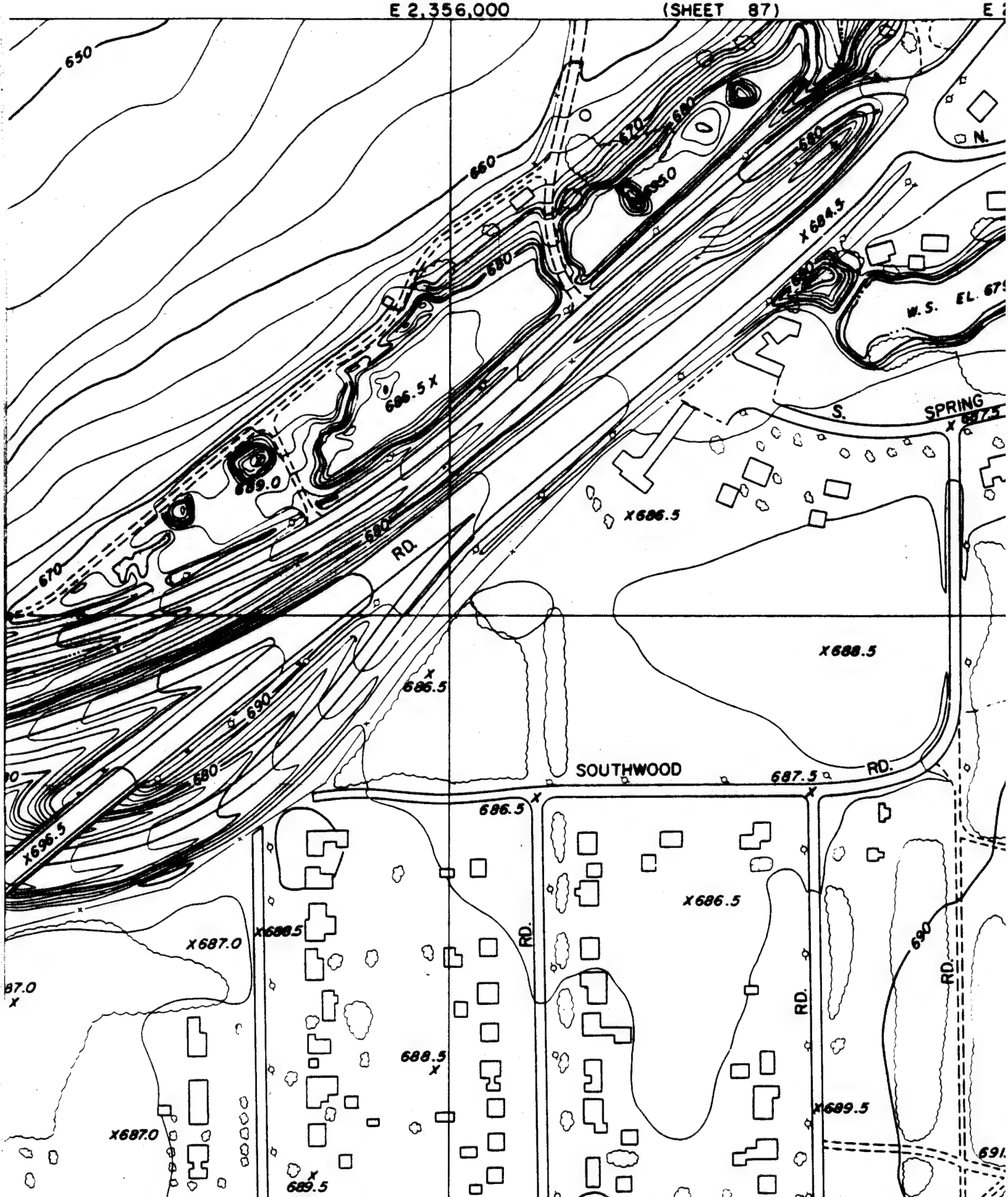
L CREEK

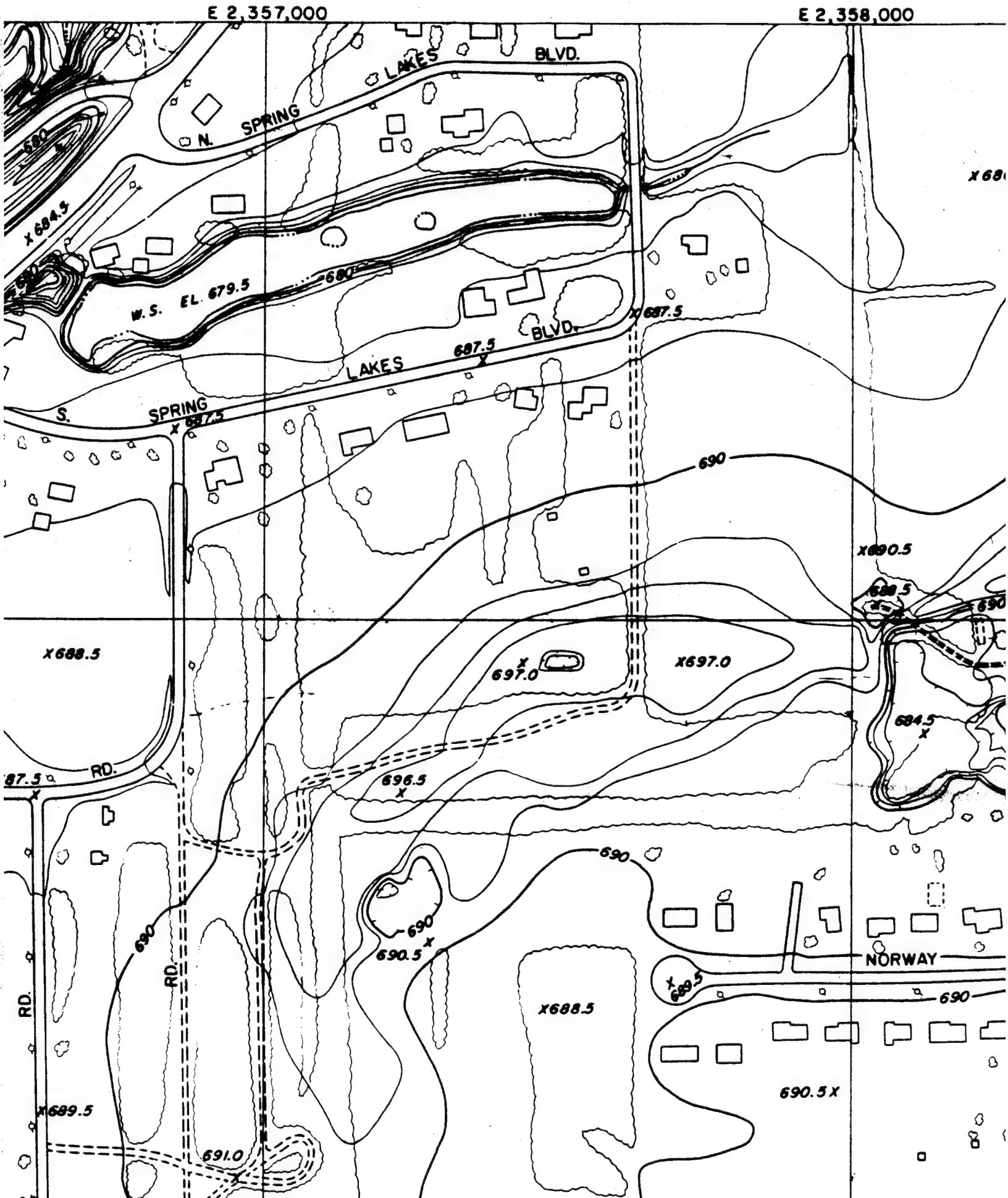
MAP

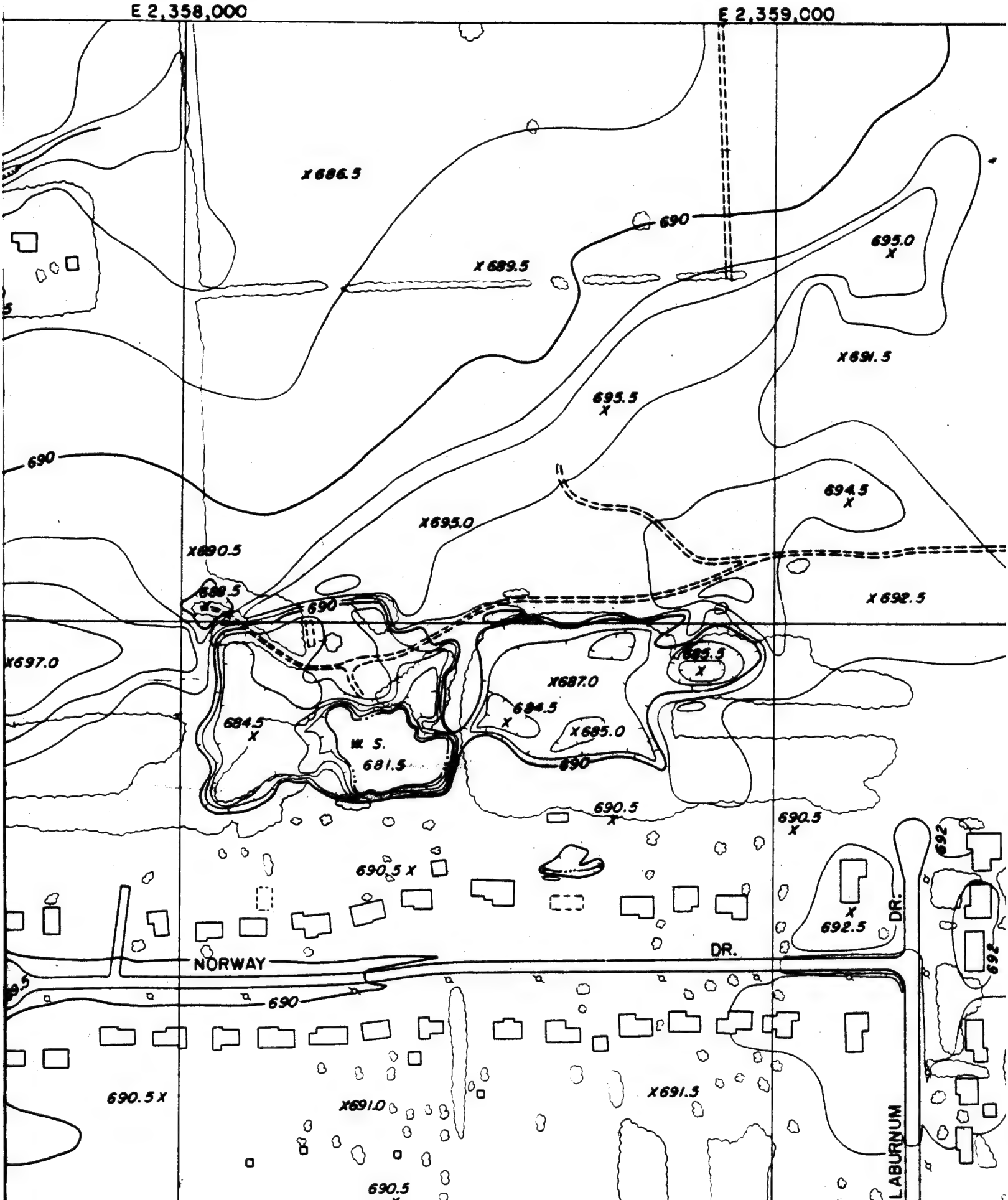
'Y, OHIO

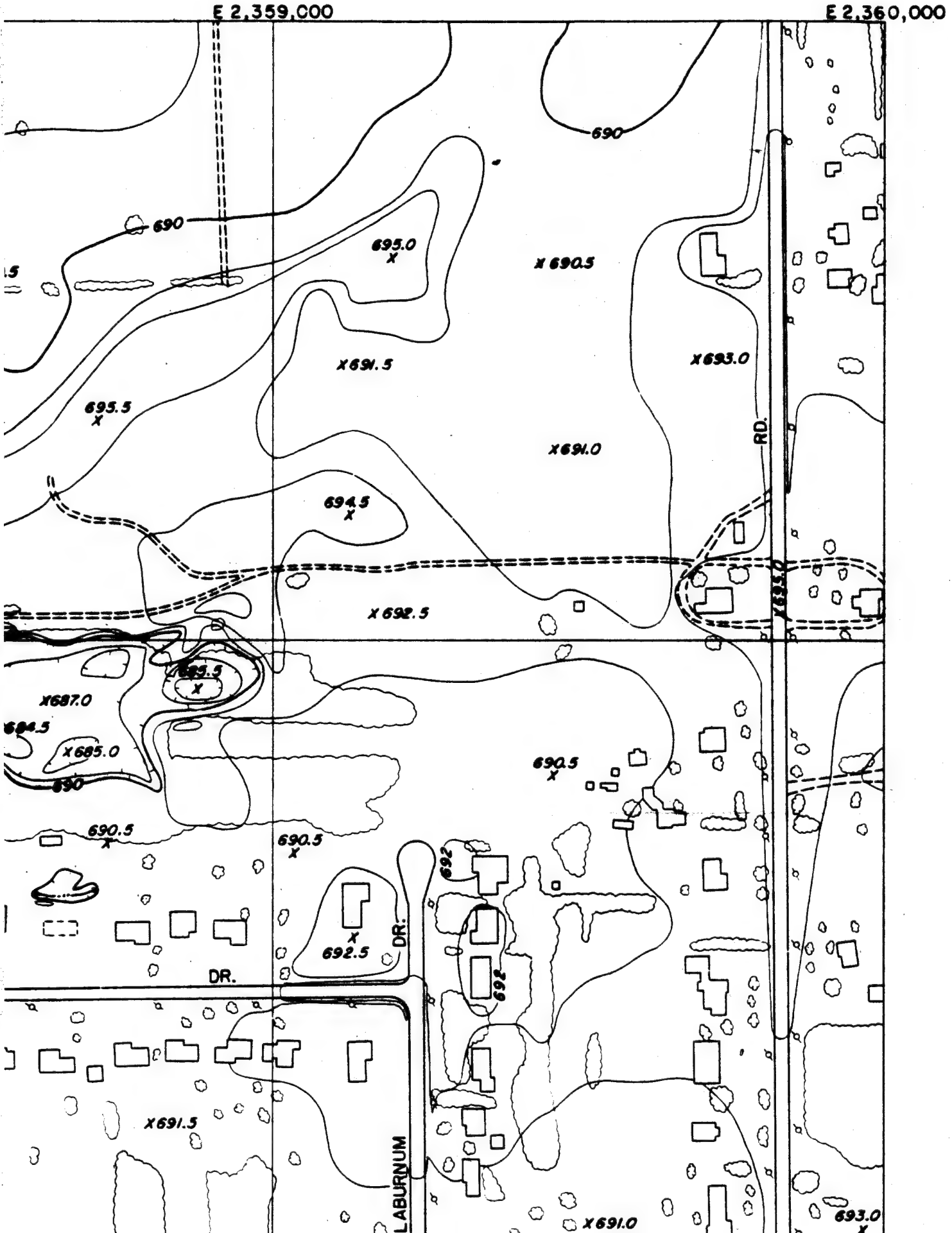

E 2,353,000
E 2,354,000
N 765,000
N 764,000
642
644
646
649.0
X642.5
646.5
646.5
650
650
660
660
LAKELAND
X656.5
X656.5

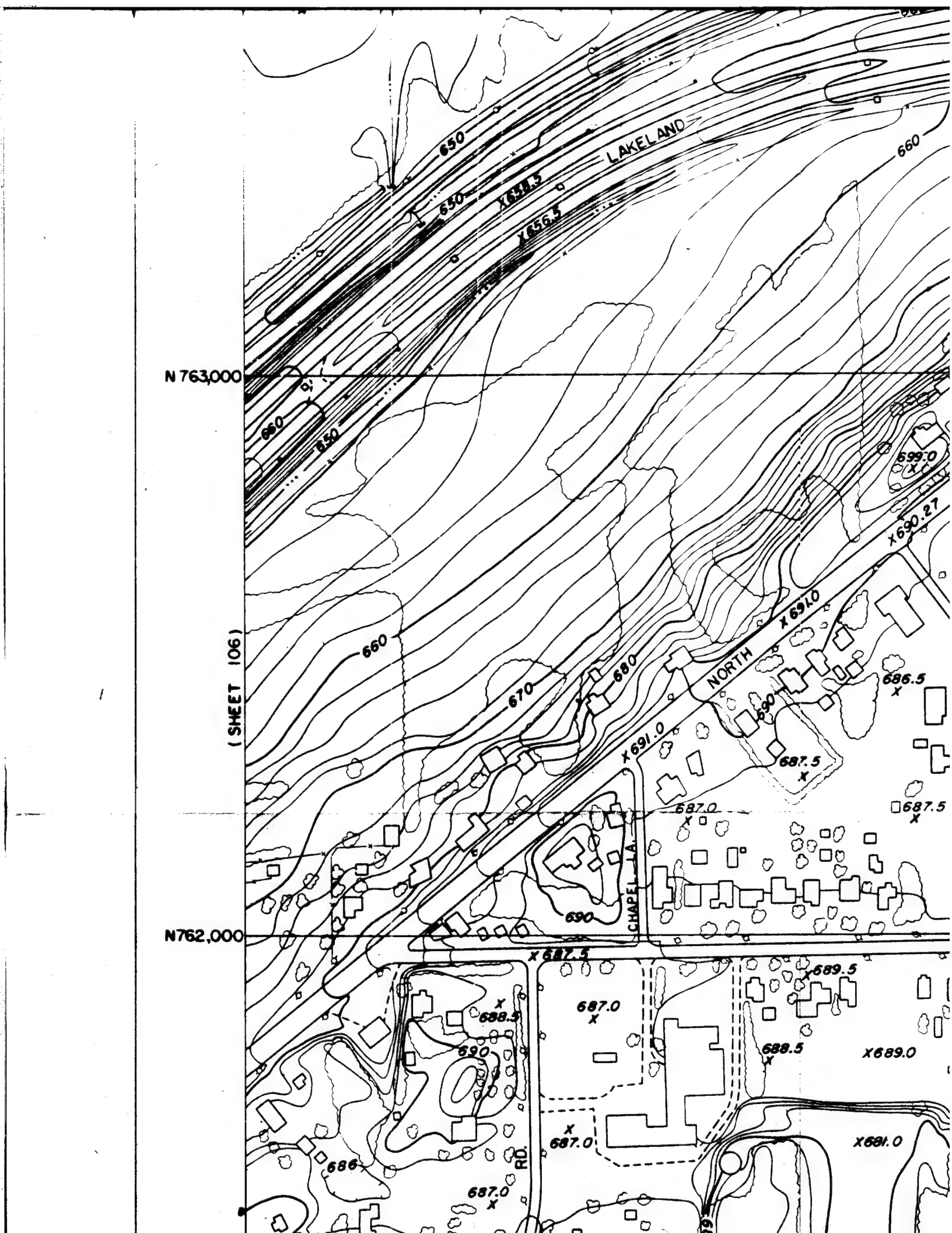

E 2,354,000
E 2,355,000
650
644
646
648
650
660
670
660
670
680
660
FREEWAY
X696.5
660
670
690
690
695.5 X
RIDGE
X686.5
687.0
X
X687.0
X689.5
688

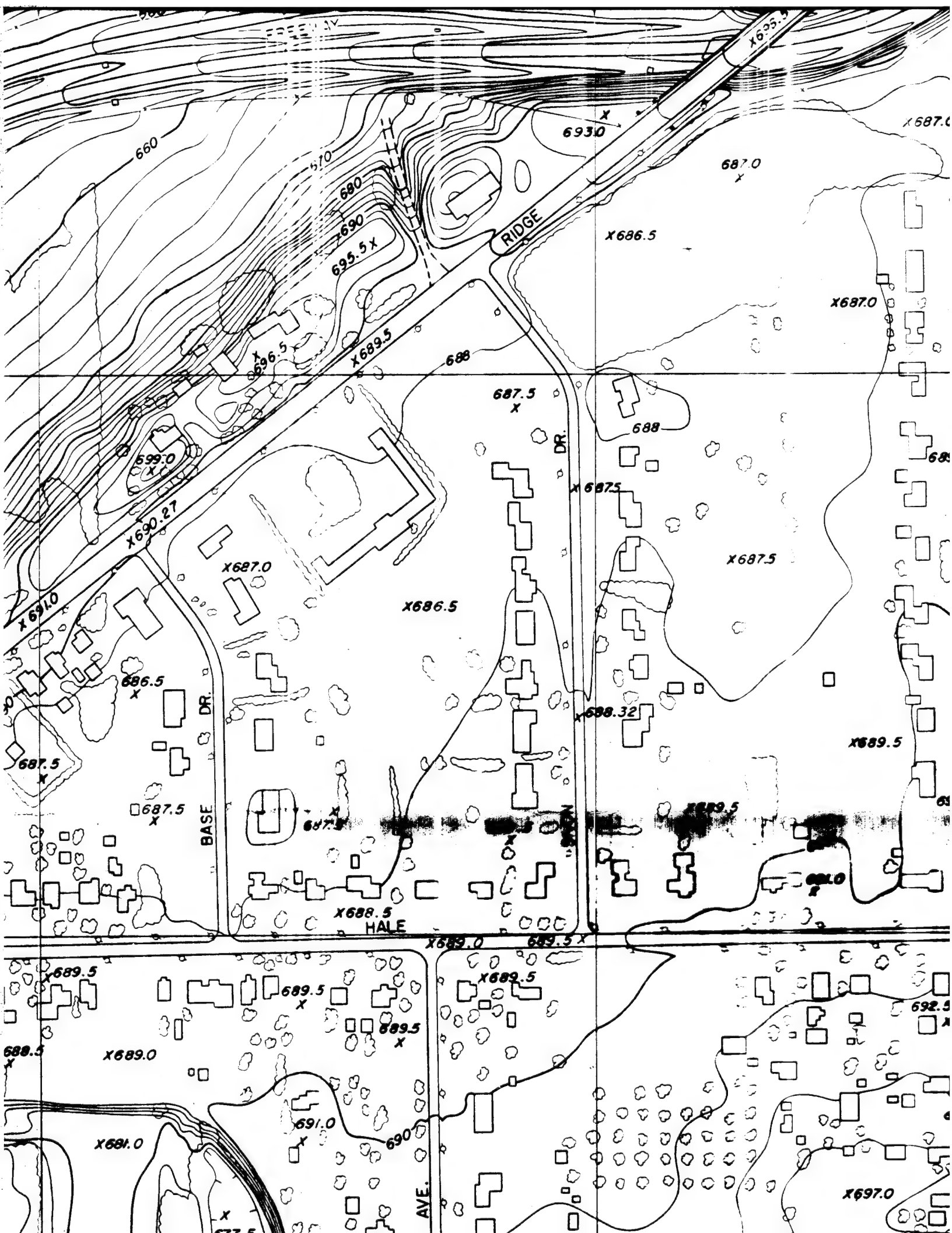

E 2,356,000
(SHEET 87)
650
660
670
680
690
686.5
689.0
684.5
W.S. EL. 675
S. SPRING
RD.
SOUTHWOOD
687.5
688.5
696.5
687.0
689.5
N.

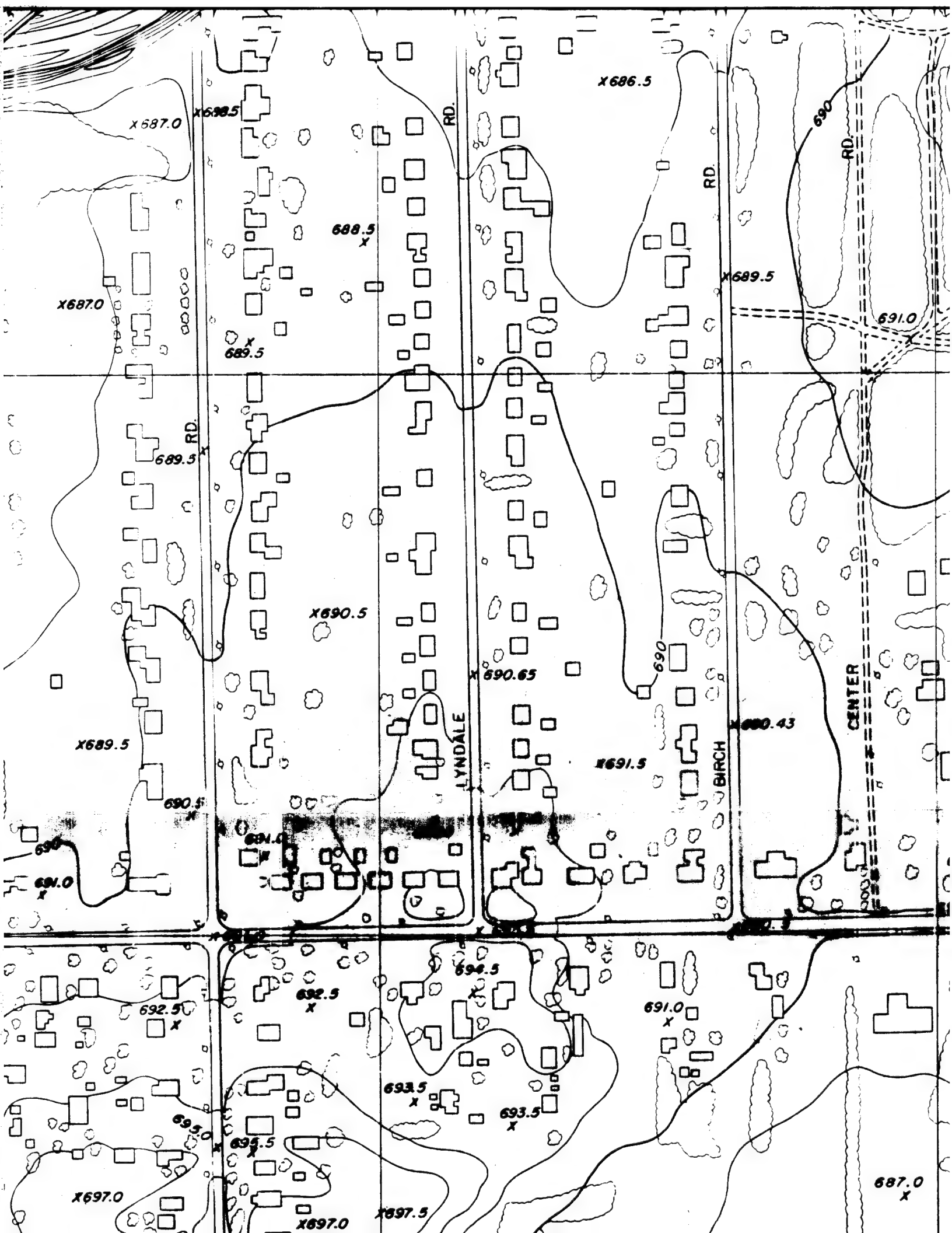

E 2,357,000
E 2,358,000
LAKES BLVD.
N. SPRING
W. S. EL. 679.5
680
684.5
687.5
LAKES BLVD.
S. SPRING
690
690.5
688.5
697.0
696.5
684.5
RD.
NORWAY
689.5
691.0
690.5

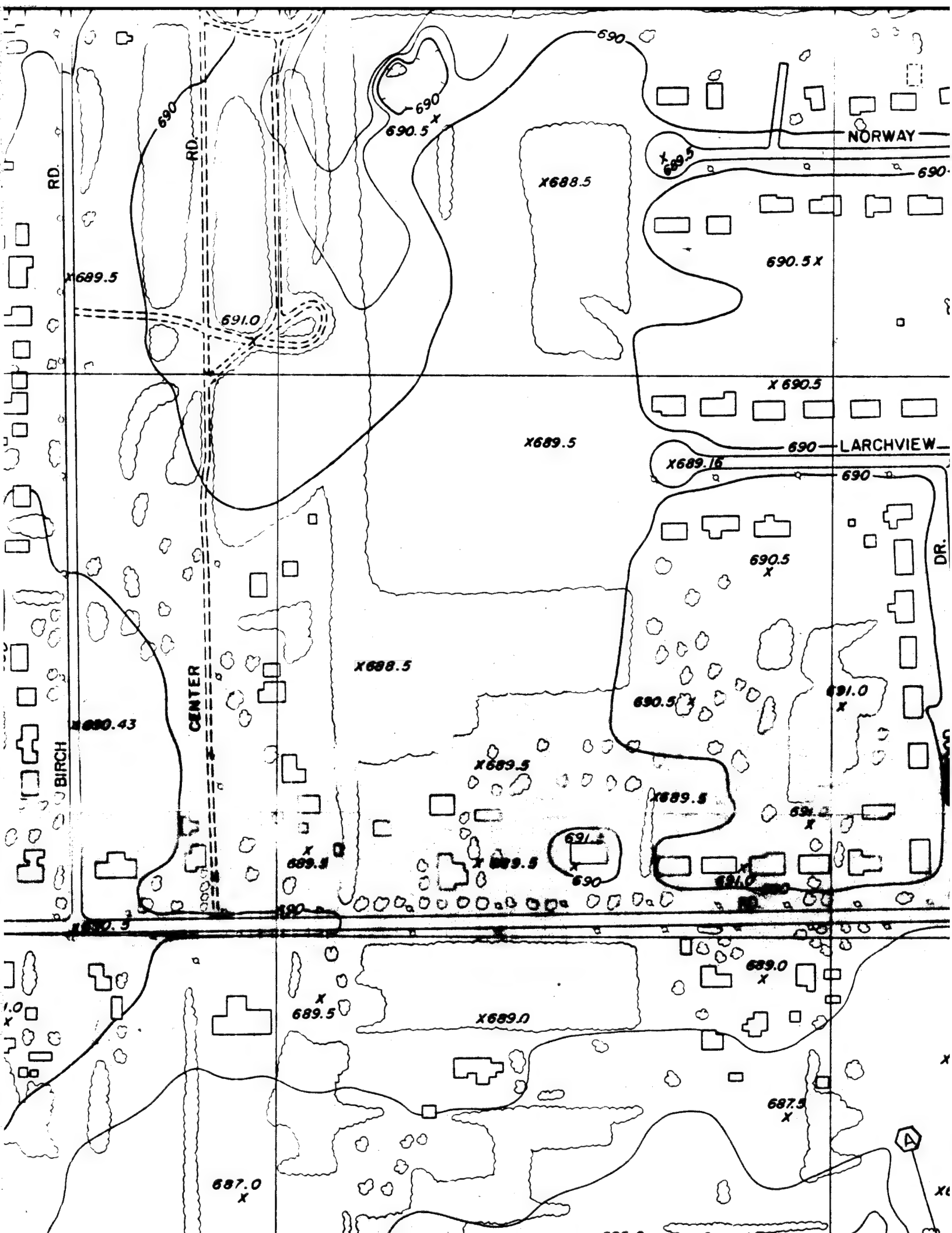

E 2,358,000
E 2,359,000
X686.5
690
X689.5
695.0
X
X691.5
695.5
X
690
694.5
X
X695.0
X690.5
688.5
X
690
X692.5
X697.0
689.5
X
X687.0
684.5
X
X685.0
684.5
X
W. S.
681.5
690
690.5
X
690.5
X
690.5 X
692
X
692.5
DR.
DR.
NORWAY
690
690.5 X
X691.0
X691.5
690.5
LABURNUM
692

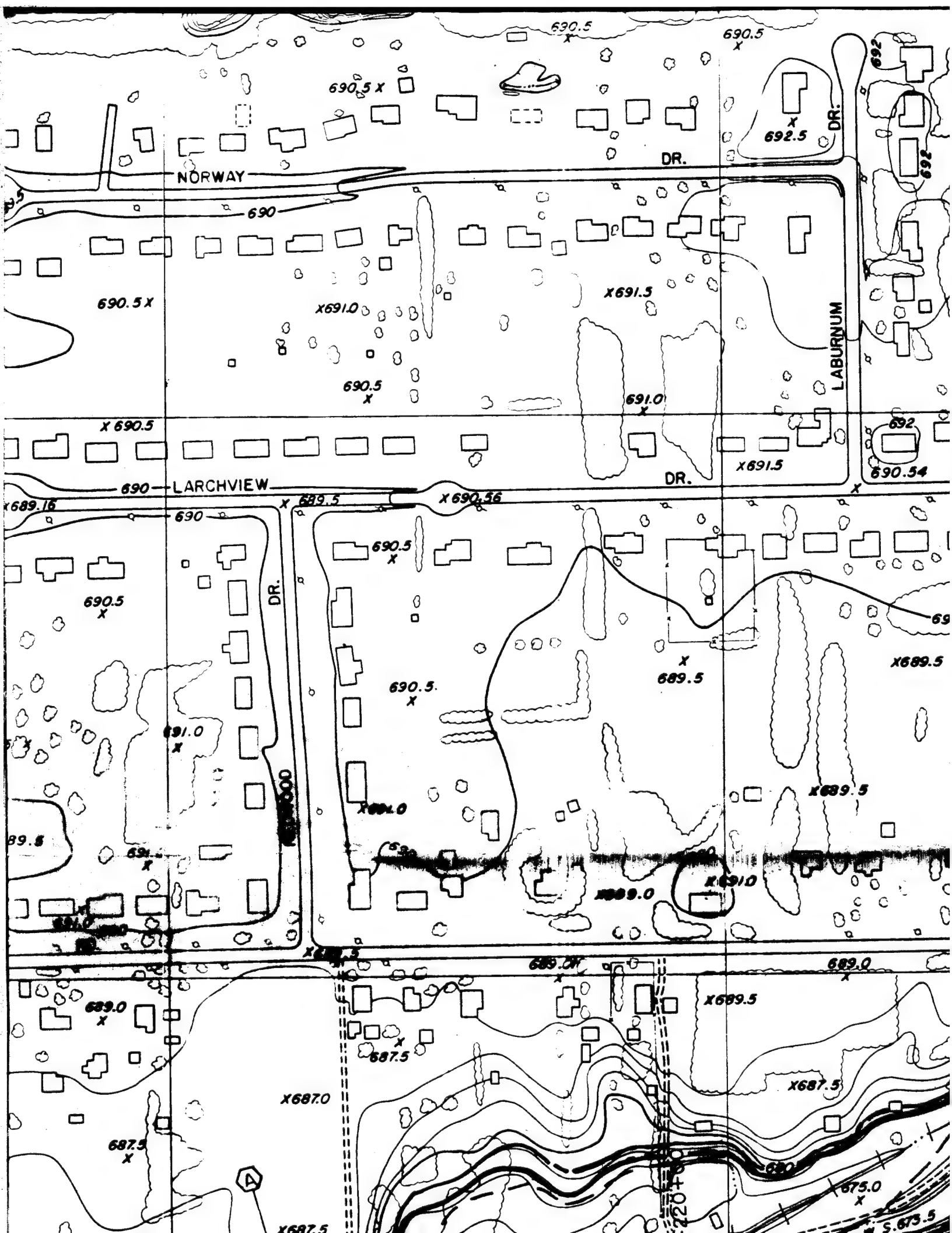

E 2,359,000
E 2,360,000
690
690
695.0
X690.5
X691.5
X693.0
695.5
X691.0
RD.
694.5
X692.5
X695.0
X687.0
694.5
X685.0
690
690.5
690.5
690.5
692
X
692.5
DR.
DR.
698
X691.5
LABURNUM
X691.0
693.0

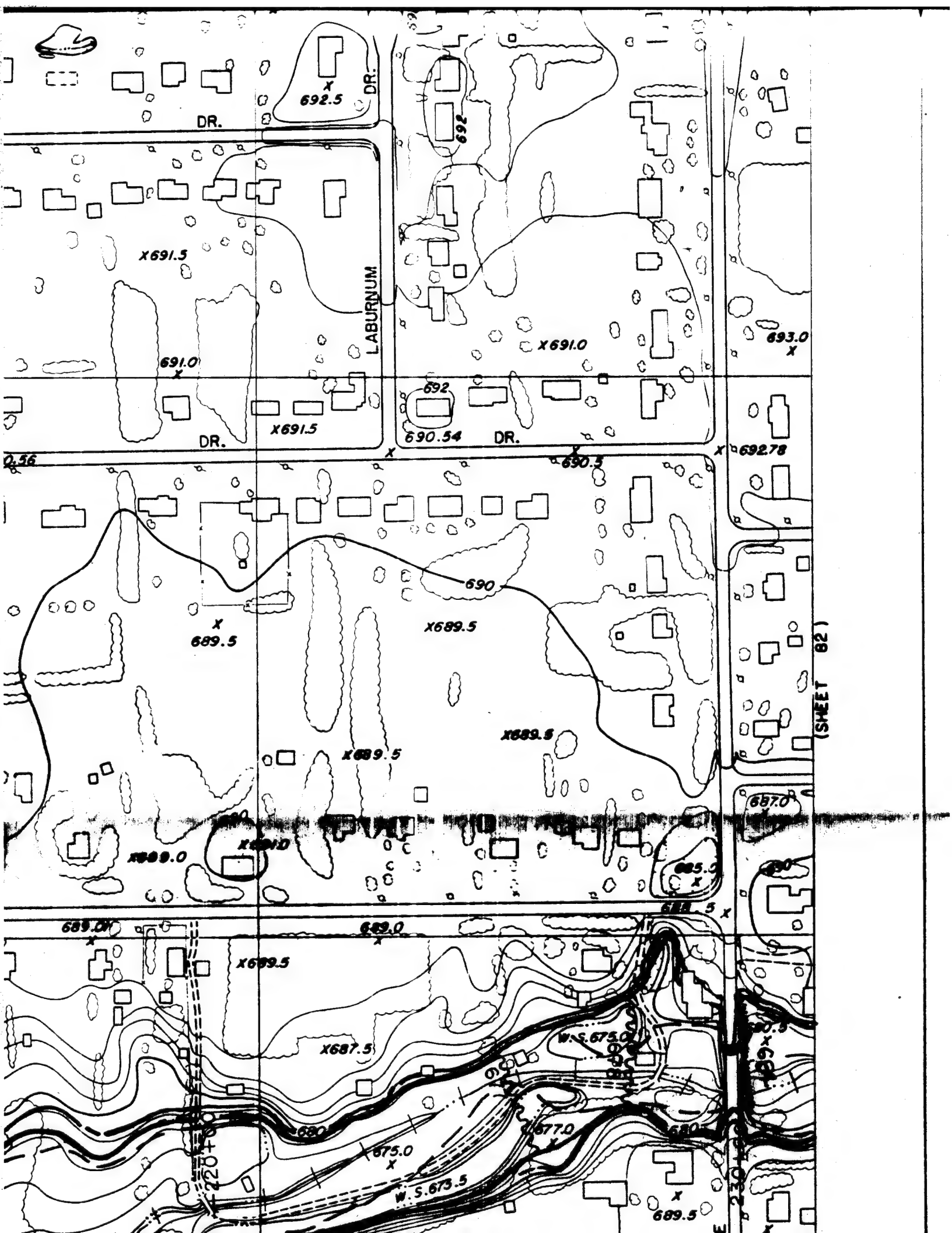

LAKELAND
650
660
670
680
690
X656.3
X656.5
X691.0
X690.27
699.0
686.5
687.5
687.0
688.5
689.5
X689.0
X691.0
NORTH
CHAPEL LA.
RD.
686
N763,000
N762,000
(SHEET 106)

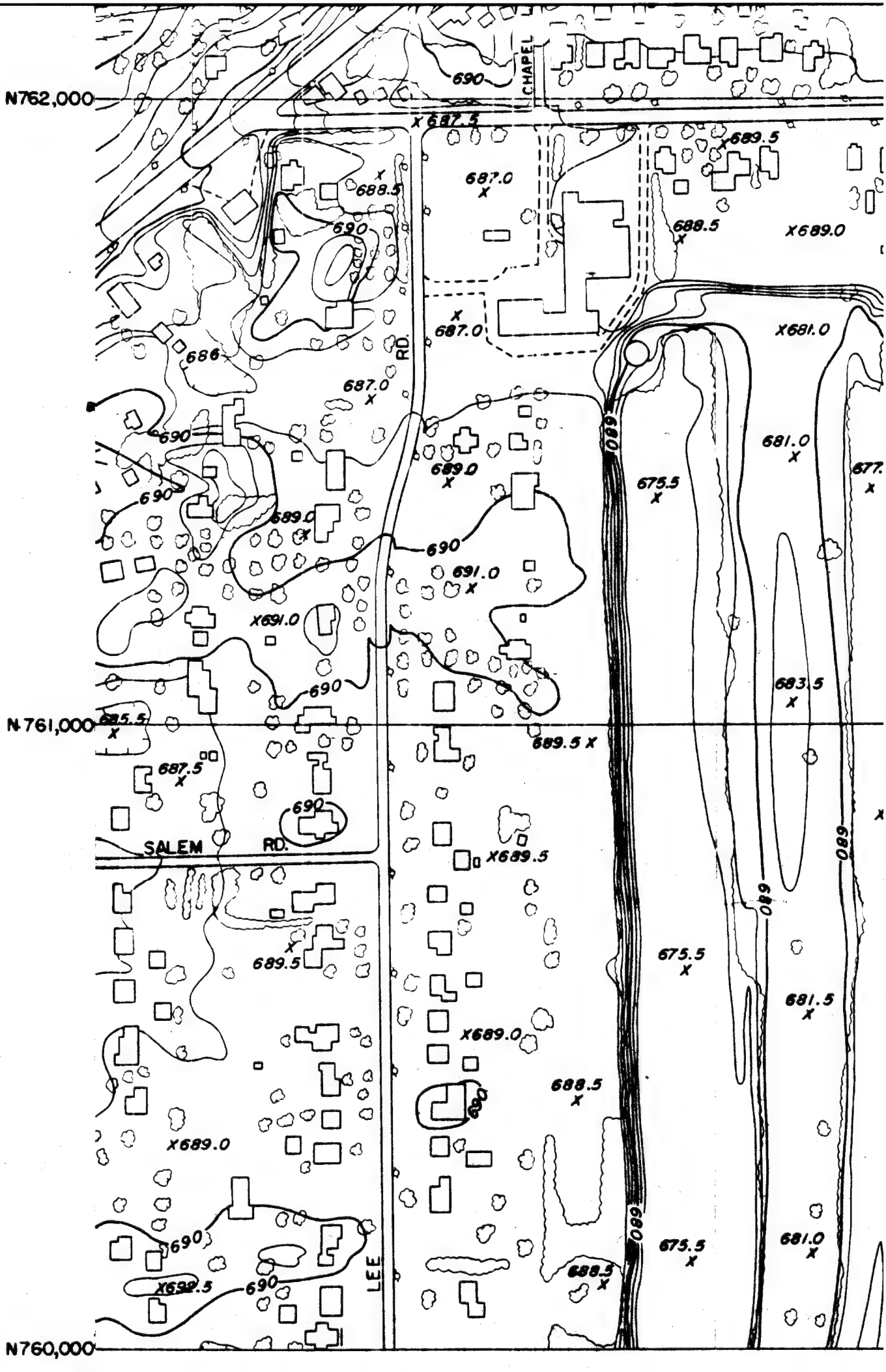

660
670
680
690
695.5
693.0
687.0
686.5
687.0
RIDGE
696.5
689.5
688
687.5
688
699.0
690.27
687.5
687.0
691.0
686.5
686.5
688.32
689.5
687.5
687.5
BASE DR.
688.5
HALE
689.0
689.5
689.5
689.5
689.5
689.5
688.5
689.0
691.0
690
681.0
AVE.
697.0

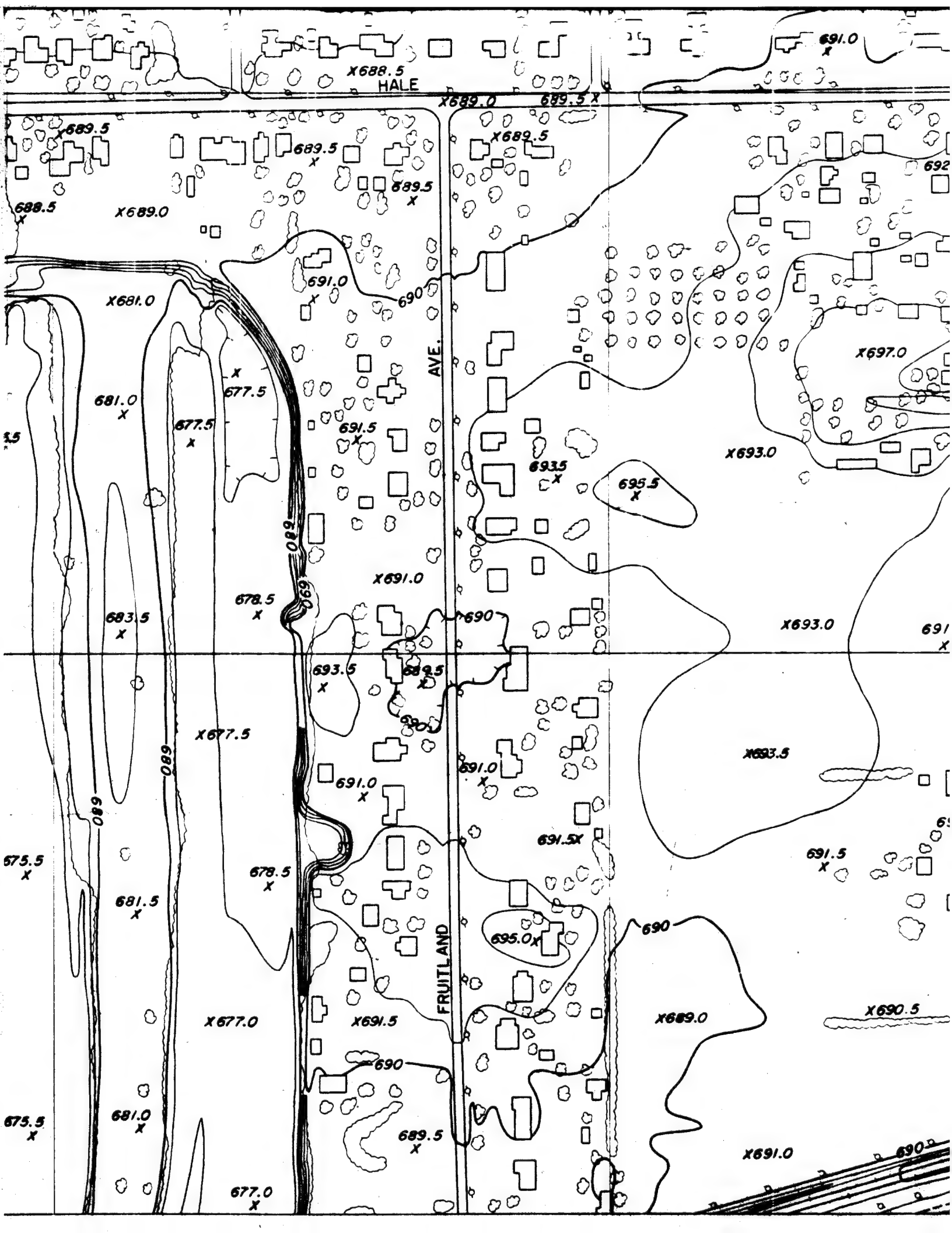

X686.5
X687.0
X688.5
RD.
690
RD.
RD.
688.5
X689.5
X687.0
691.0
689.5
RD.
689.5
X690.5
690
X690.65
X689.5
LYNDALE
X691.5
BIRCH
X690.43
CENTER
690.5
691.0
690
691.0
694.5
692.5
692.5
691.0
693.5
693.5
695.0
695.5
X697.0
X697.5
X697.0
687.0

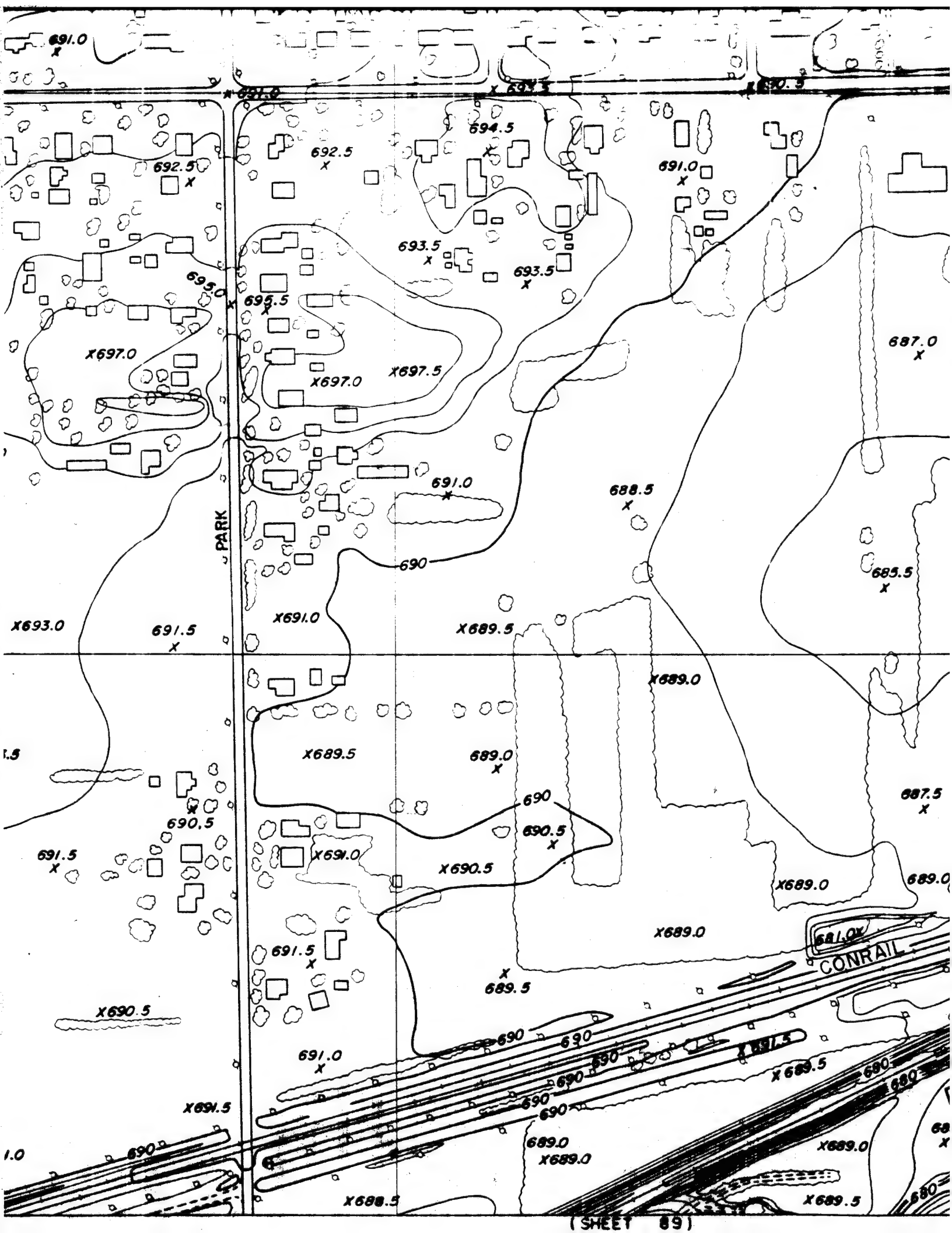

690
690
690.5
RD.
RD.
NORWAY
X688.5
690.5X
X689.5
691.0
X 690.5
X689.5
690
LARCHVIEW
X689.16
690
690.5
DR.
X688.5
690.5
691.0
690.43
CENTER
BIRCH
X689.5
X689.5
691.
690
689.5
689.0
X689.0
687.5
687.0
4

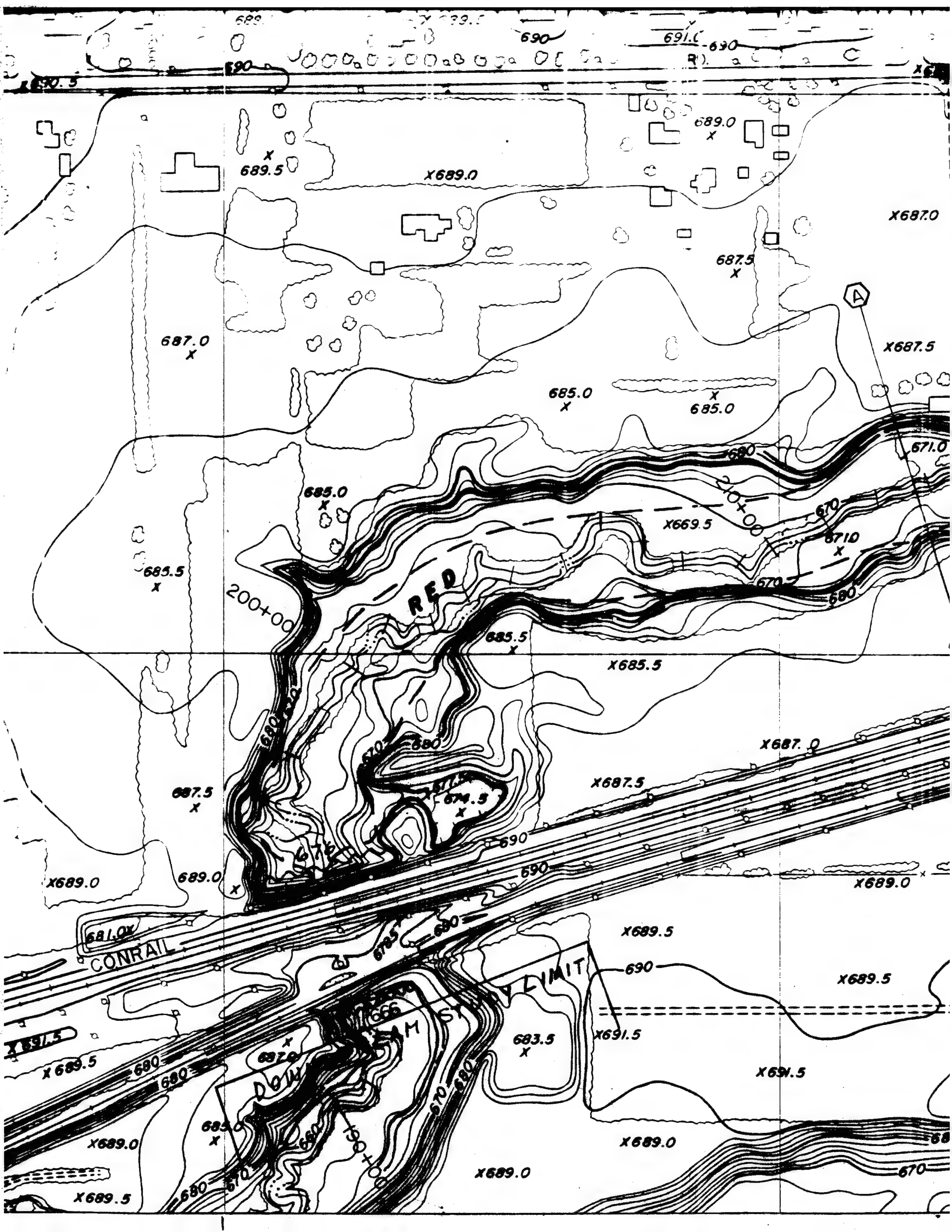

690.5
690.5
690.5 x
692.5
DR.
692
NORWAY
690
690.5 x
x691.5
x691.0
690.5
691.0
LABURNUM
x 690.5
692
690.54
DR.
x691.5
690 LARCHVIEW
x689.16
x 689.5
x 690.56
690
690.5
690.5
DR.
x
689.5
x689.5
690.5
691.0
x689.5
x689.0
x691.0
689.0
689.0
x689.5
687.5
x687.5
x687.0
687.5
A
675.0
673.5
20+

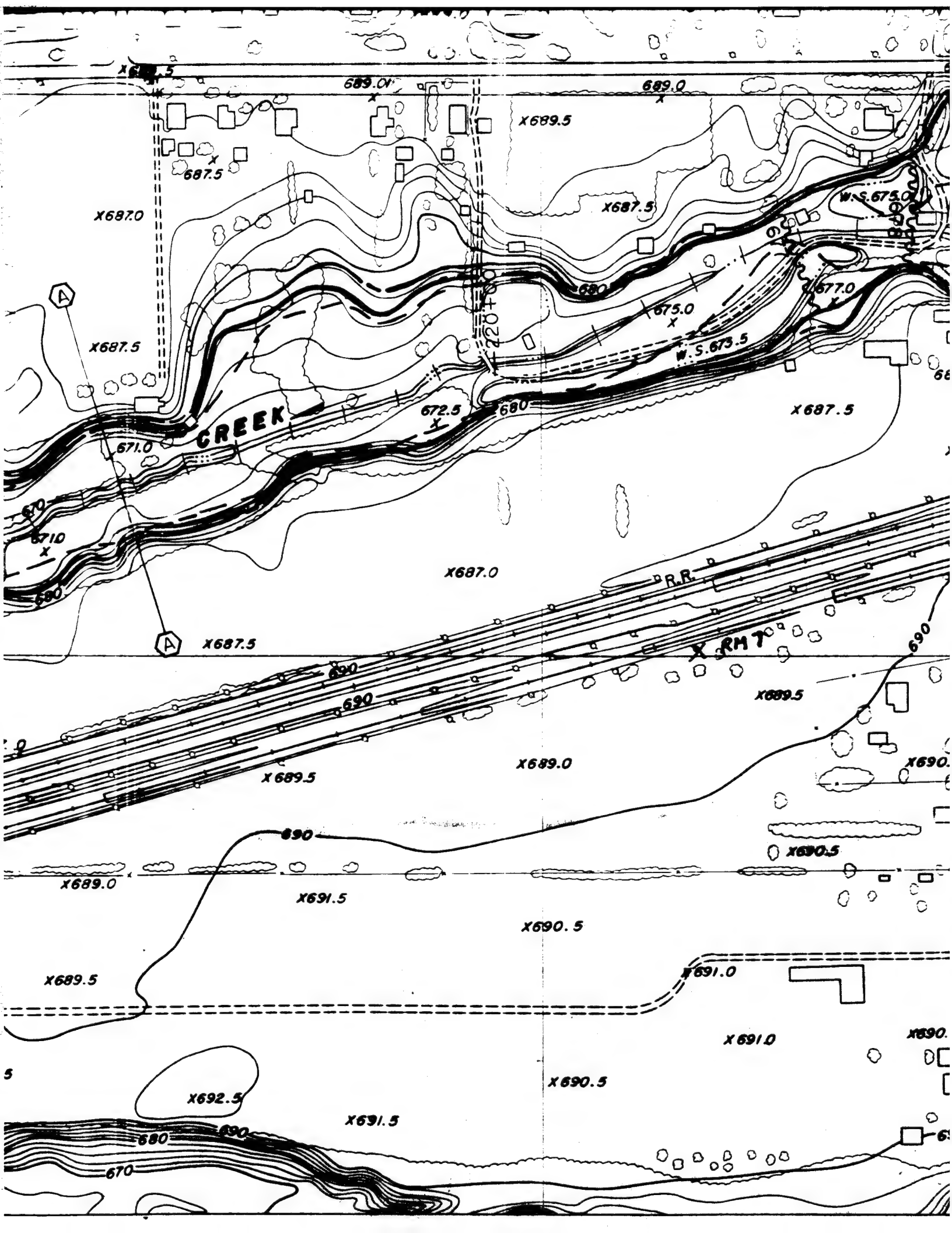

DR.
692.5
DR.
692
LABURNUM
X691.5
X691.0
693.0
691.0
692
X691.5
690.54
DR.
DR.
692.78
690.5
690
X689.5
689.5
X689.5
X689.5
687.0
X689.0
X689.0
685.0
689.0
689.0
X689.5
X687.5
W.S.675.0
680
677.0
680
675.0
W.S.673.5
689.5
(SHEET 82)

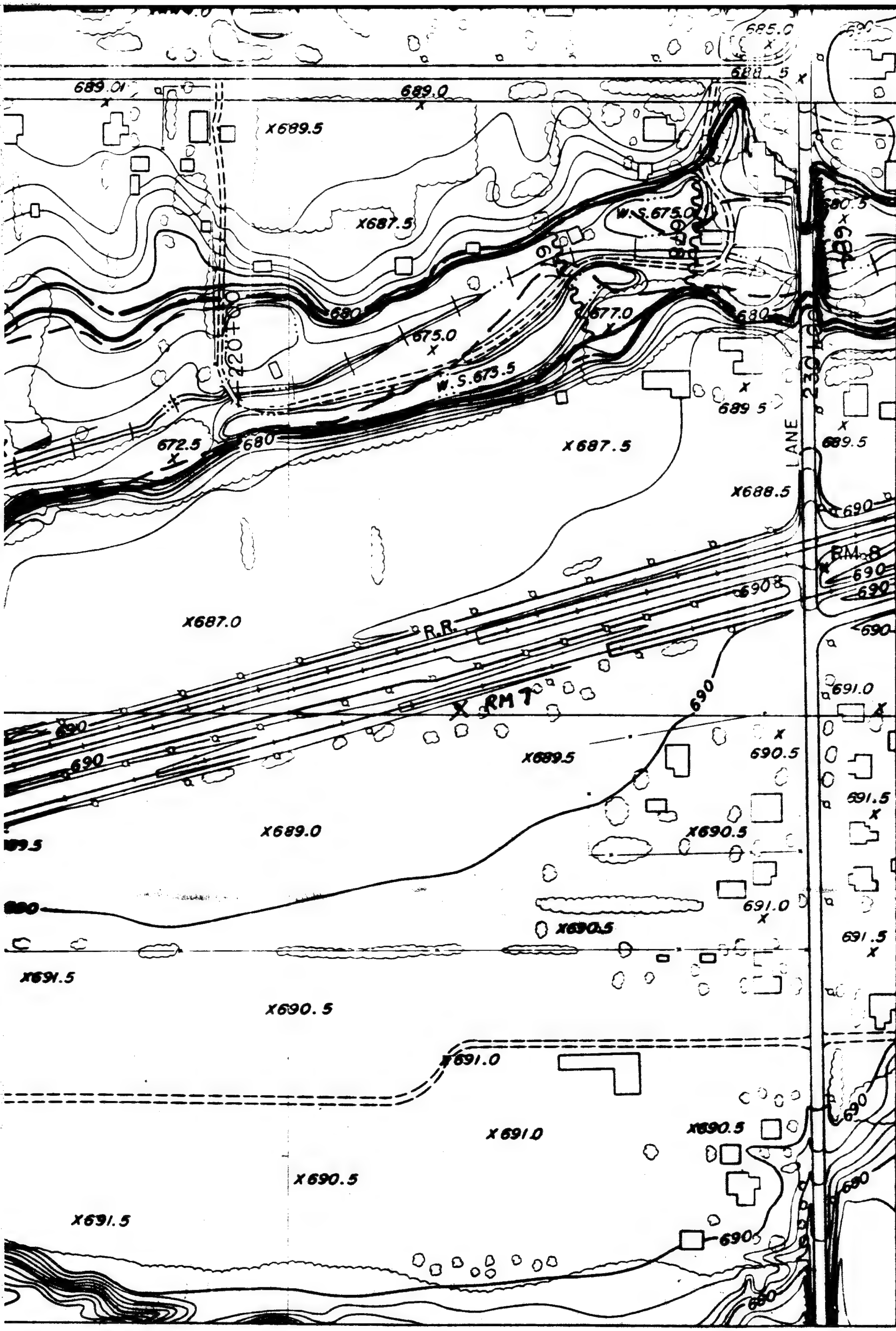

N762,000
N761,000
N760,000
CHAPEL
RD.
SALEM
RD.
LEE
690
687.5
689.5
688.5
687.0
689.0
686
691.0
675.5
681.0
683.5
681.5
692.5


HALE
AVE.
FRUITLAND
X688.5
X689.0
689.5
691.0
688.5
X689.0
689.5
689.5
689.5
691.0
690
X681.0
681.0
677.5
677.5
691.5
X697.0
X693.0
693.5
695.5
689
X691.0
678.5
683.5
690
X693.0
693.5
689.5
690
X677.5
691.0
691.0
X693.5
691.5
691.5
675.5
678.5
681.5
695.0
690
X690.5
X677.0
X691.5
690
X689.0
675.5
681.0
689.5
677.0
X691.0
690

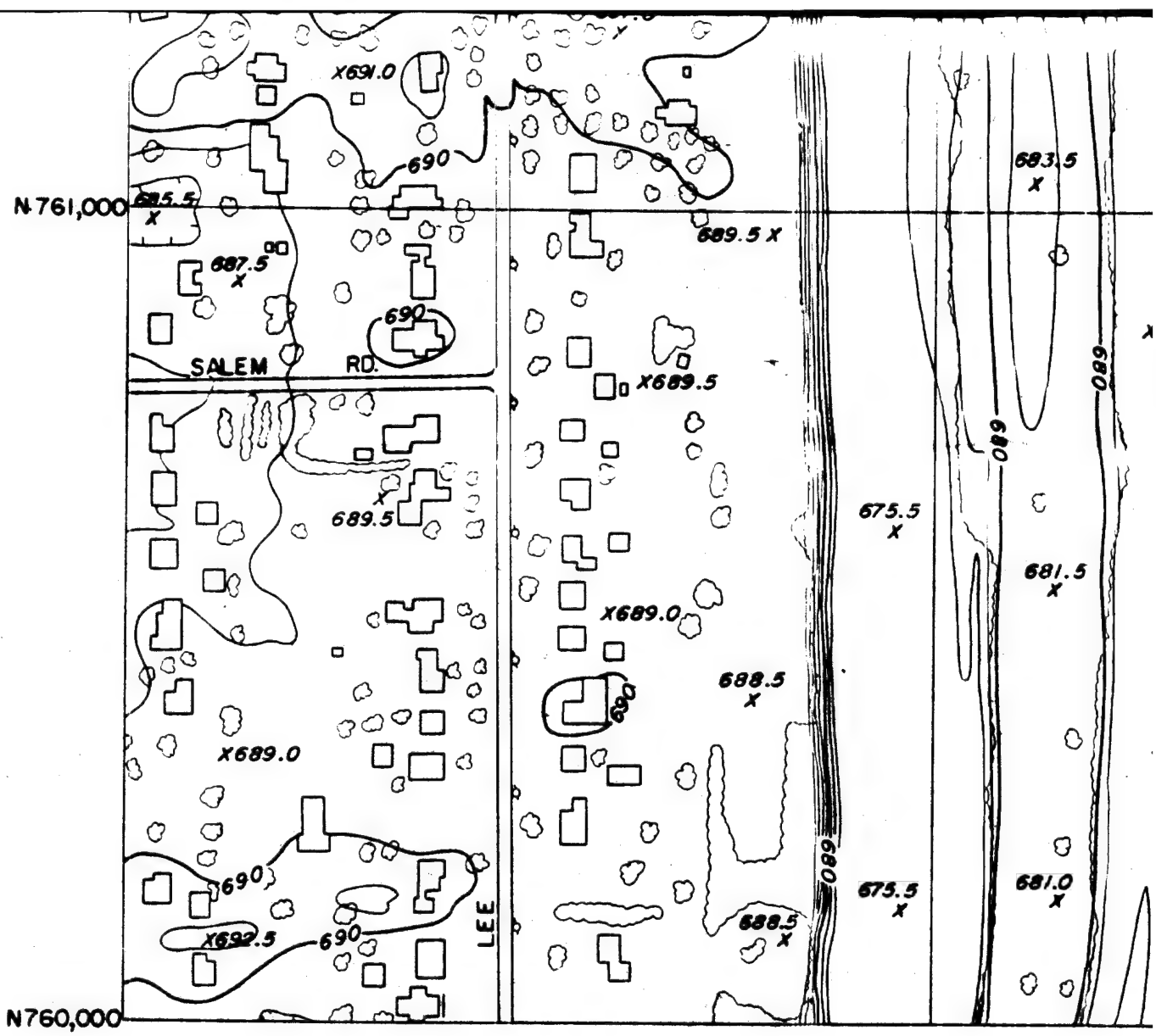

691.0
692.5
694.5
692.5
691.0
693.5
693.5
695.0
695.5
697.0
697.0
697.5
687.0
691.0
688.5
PARK
690
685.5
693.0
691.5
691.0
689.5
689.0
689.5
690
690.5
690.5
691.5
691.0
690.5
689.0
689.0
687.5
689.0
691.5
689.5
CONRAIL
690.5
691.0
690
690
690
690
690
690
691.5
689.5
690
690
691.5
689.0
689.0
689.0
688.5
689.5
(SHEET 89)


X689.0
X687.0
687.5
687.0
X687.5
685.0
685.0
685.0
685.5
200+00
RED
210+00
X669.5
671.0
671.0
670
680
685.5
X685.5
X687.0
687.5
X687.5
674.5
690
X689.0
689.0
X689.0
681.0
CONRAIL
X689.5
690
LIMIT
X689.5
683.5
X691.5
X691.5
X689.5
X689.0
685.0
X689.0
X689.0
X689.5
670
680


689.0
689.0
X689.5
687.5
X687.0
X687.5
W.S.675.0
677.0
675.0
W.S.673.5
672.5
680
X687.5
CREEK
671.0
670
671.0
680
X687.0
R.R.
A
X687.5
X RMT
690
690
690
X689.5
X689.0
X689.5
X690.
690
X690.5
X689.0
X691.5
X690.5
X689.5
X691.0
X691.0
X690.
5
X690.5
X692.5
X691.5
680
690
670
6



685.0
688.5
689.01
689.0
X689.5
X687.5
W.S.675.0
680
675.0
677.0
W.S.673.5
220+00
672.5
680
X687.5
689.5
LANE
689.5
X688.5
690
RM 8
690
X687.0
R.R.
X RM 7
690
X689.5
690.5
691.0
X689.0
X690.5
691.5
691.0
X690.5
X691.5
691.5
X690.5
X691.0
X691.0
X690.5
X690.5
X691.5
690
680



OHIO COORDINATE SYSTEM
LAMBERT GRID

ELEVATIONS ARE BASED ON
MEAN SEA LEVEL 1927
NORTH AMERICAN DATUM

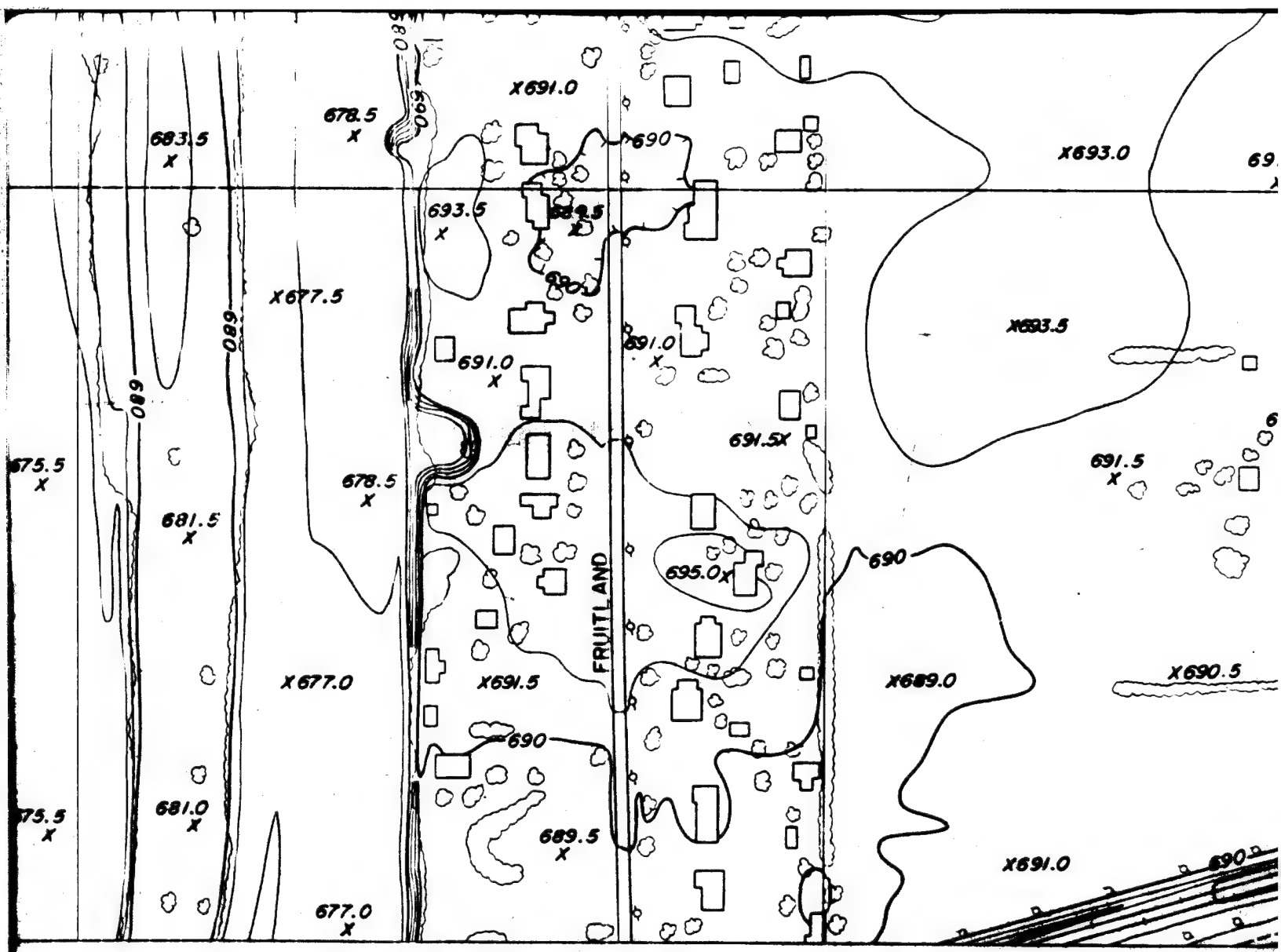
PREPARED BY:
KUCERA & ASSOCIATES INC.
PHOTOGRAMMETRIC ENGINEERS
MENTOR, OHIO

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS

A

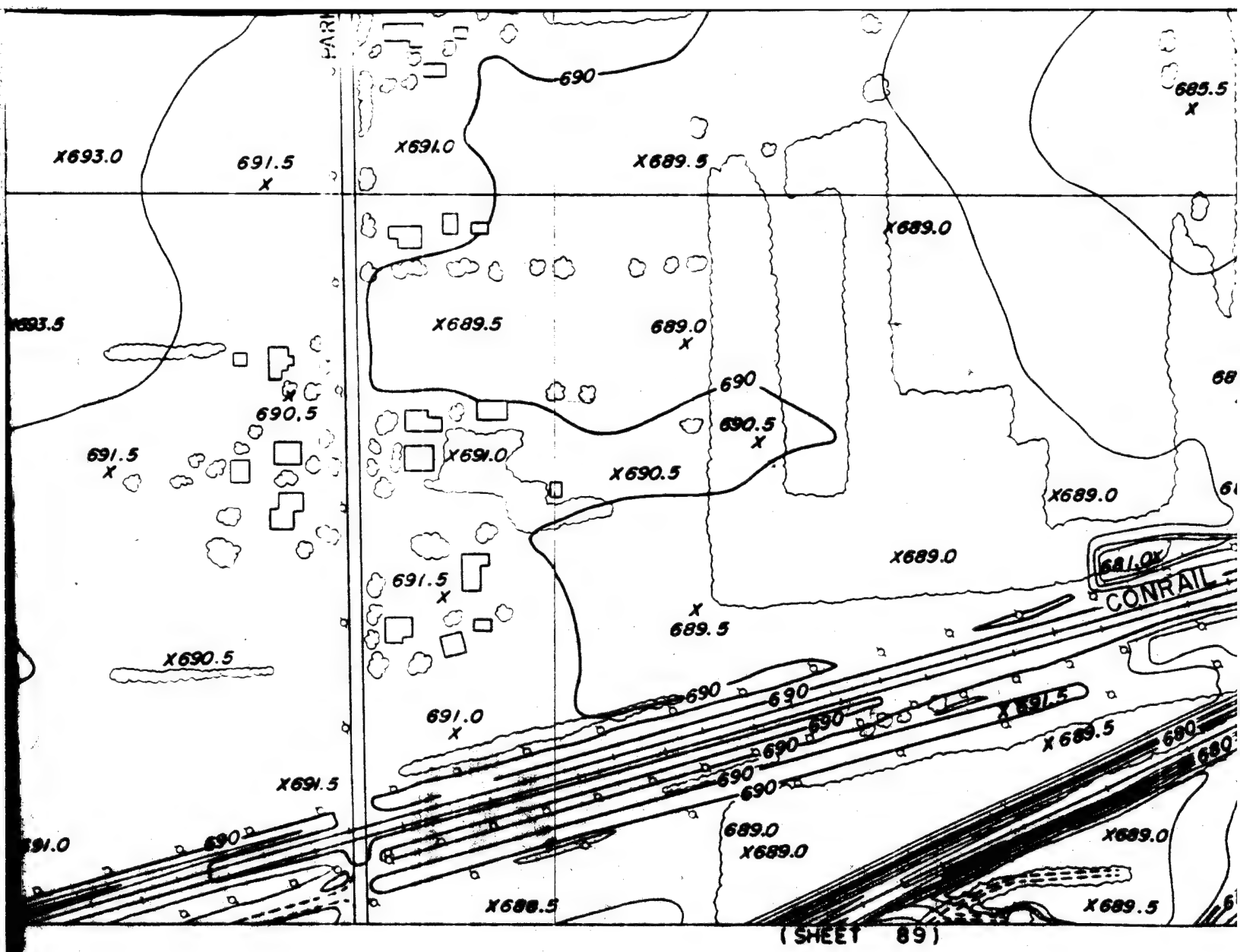
RM1

650



LEGEND

- 100 YEAR FLOOD LIMITS
- 500 YEAR FLOOD LIMITS
- FLOODWAY LIMITS
- A — A CROSS SECTION LOCATION
- RM1 X ELEVATION REFERENCE MARK
- HYDRAULIC BASELINE
- 650 BASE FLOOD ELEVATION

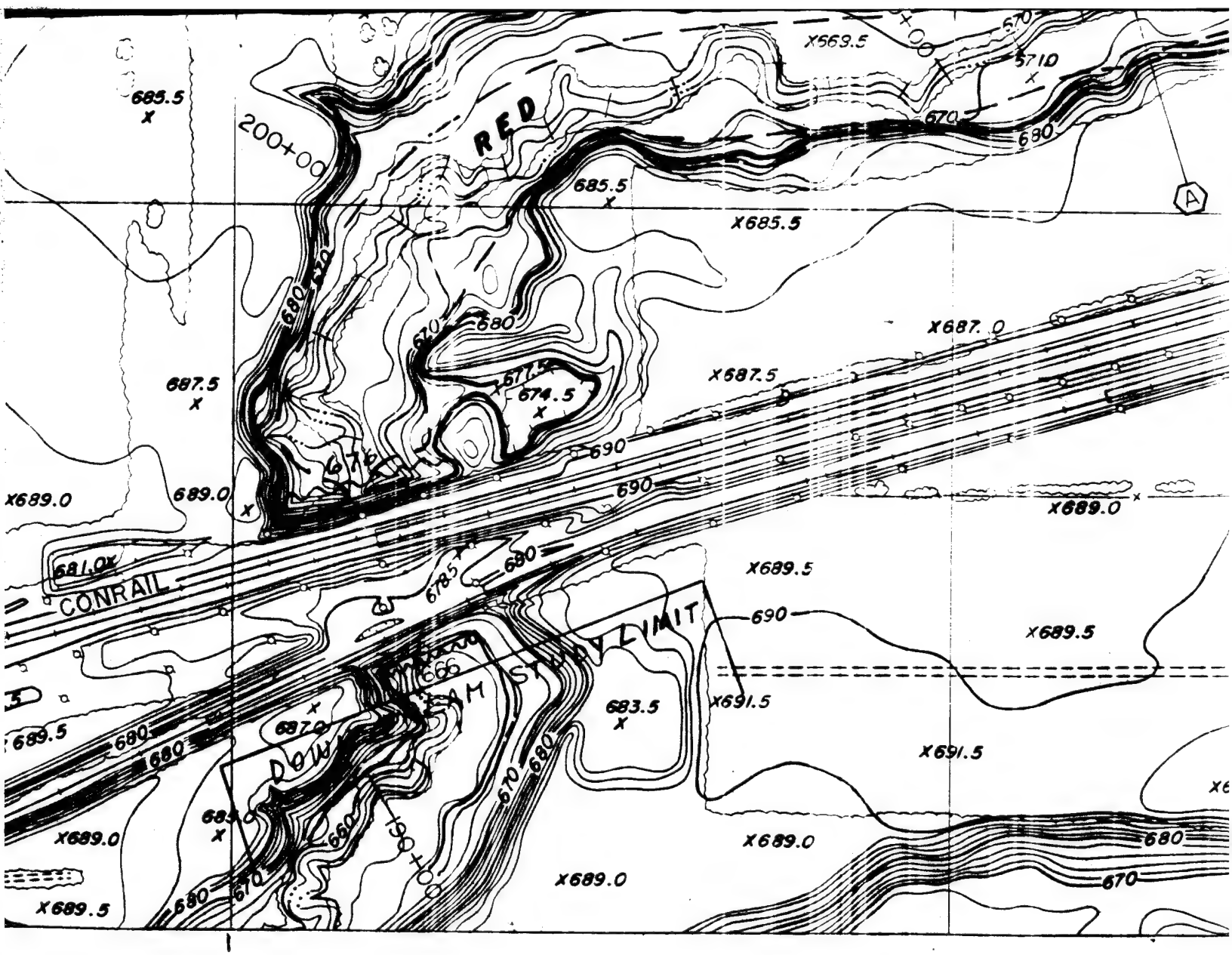


200 100 0 200 400 600

SCALE: 1" = 200' CONTOUR INTERVAL: 2'

DATE OF PHOTOGRAPHY

NOVEMBER, 1966 – JANUARY 1967



N

600 600 FEET

INTERVAL: 2'

Y

URY 1967

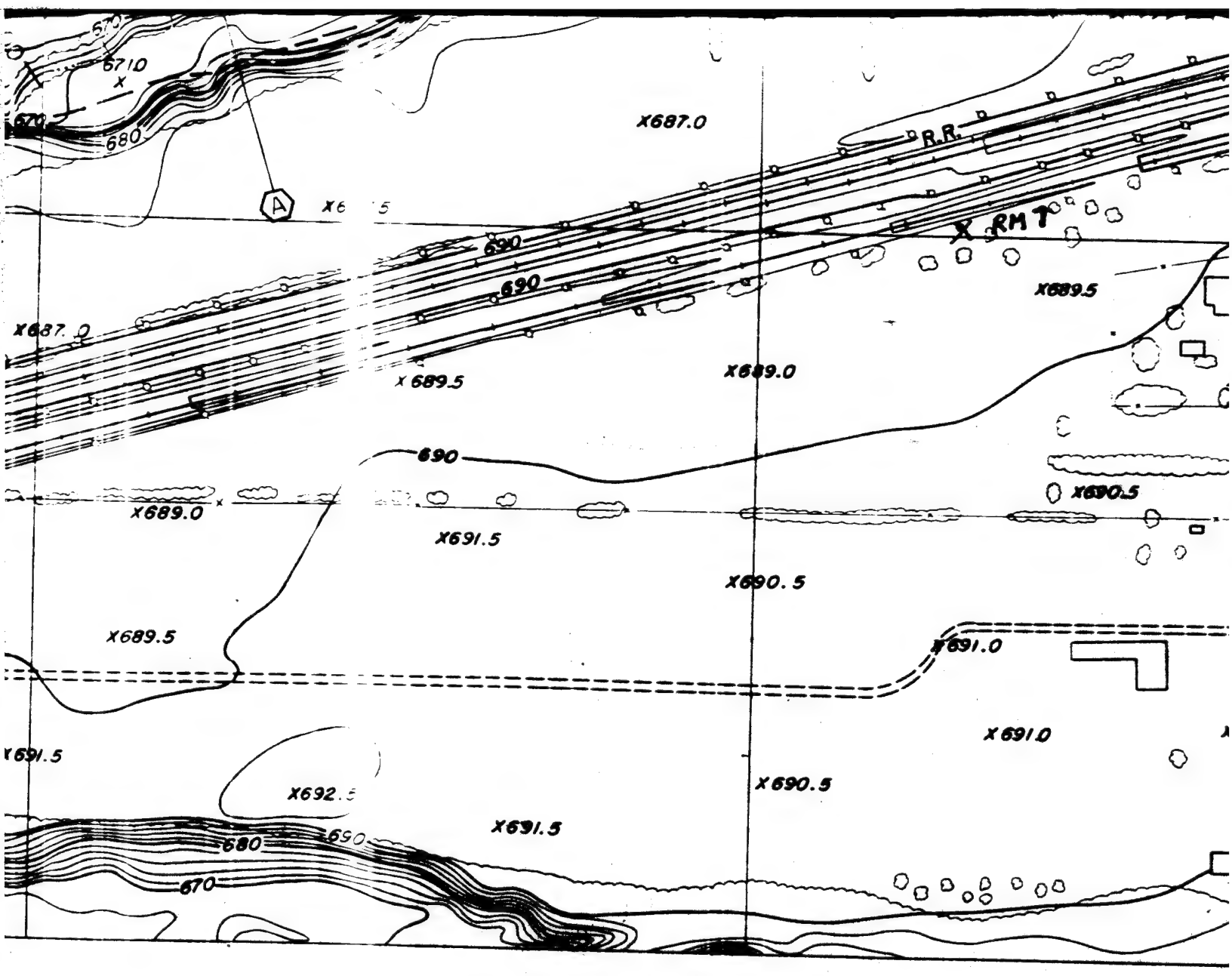
IND

88

RED CREEK -

FLOODE

VILLAGE



N

INDEX OF SHEETS

	83	64	56
88	82	05	55

LAKE COUNTY,

TOPOGRAPHIC MA

PREPARED FOR

BOARD OF LAKE COUNTY CO

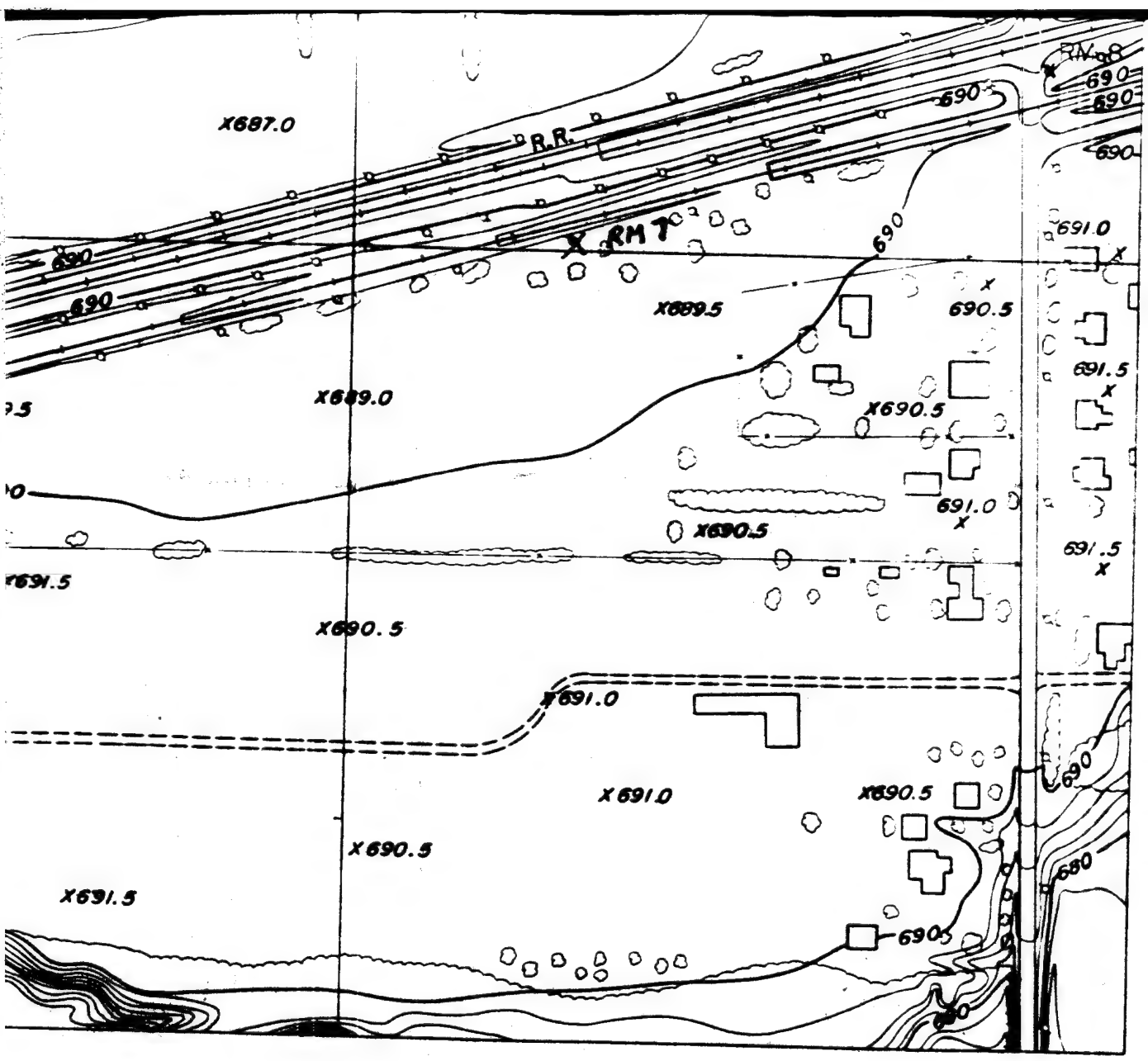
ROBERT B. FULTON, CHAIRMA

JOHN D. HADDEN – HOWARD B. BI

RED CREEK. RED MILL CREEK

FLOODED AREA MAP

VILLAGE OF PERRY, OHIO



LAKE COUNTY, OHIO

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSIONERS

ROBERT B. FULTON, CHAIRMAN

JOHN D. HADDEN — HOWARD B. BEEBE

IEETS

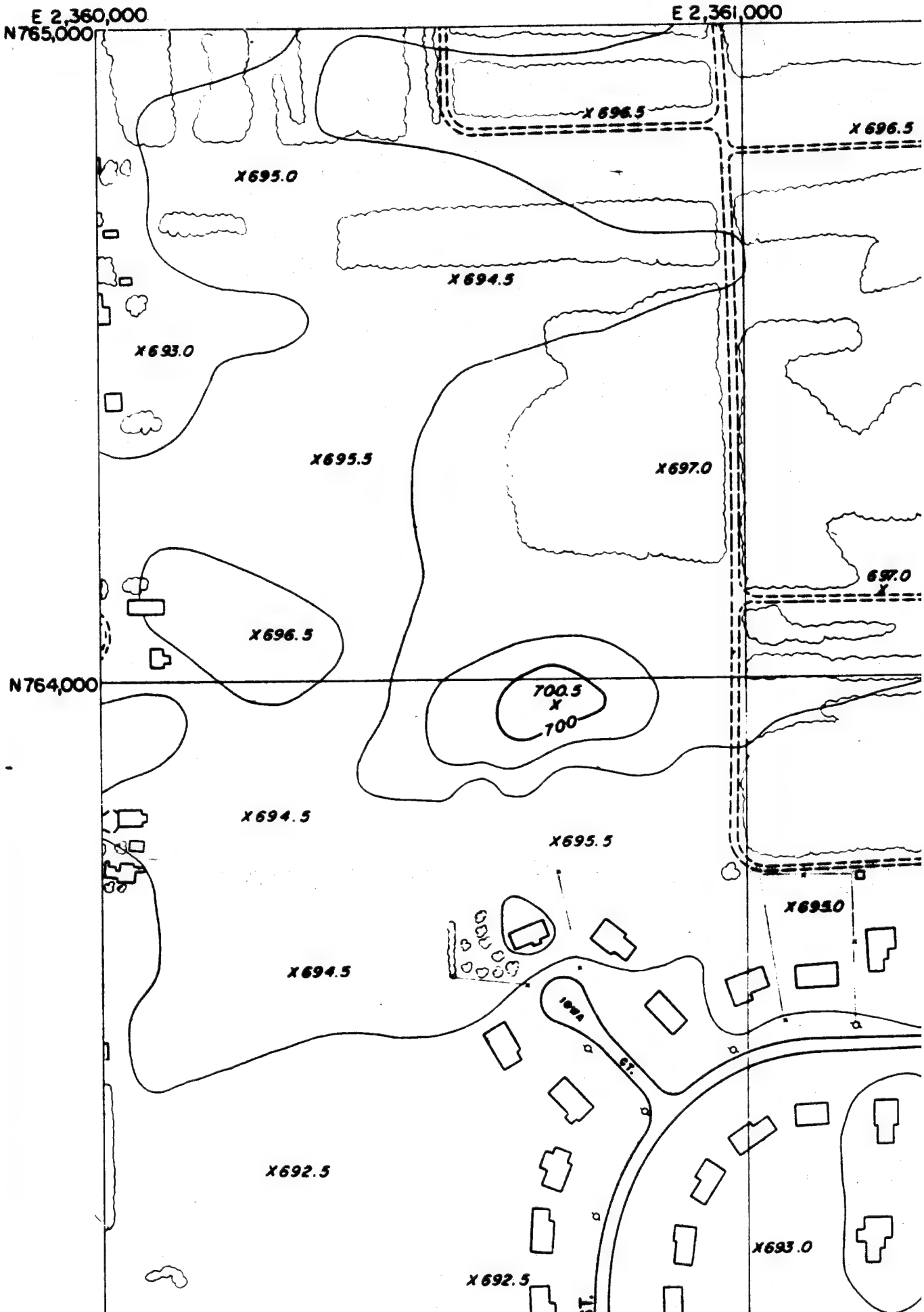
56

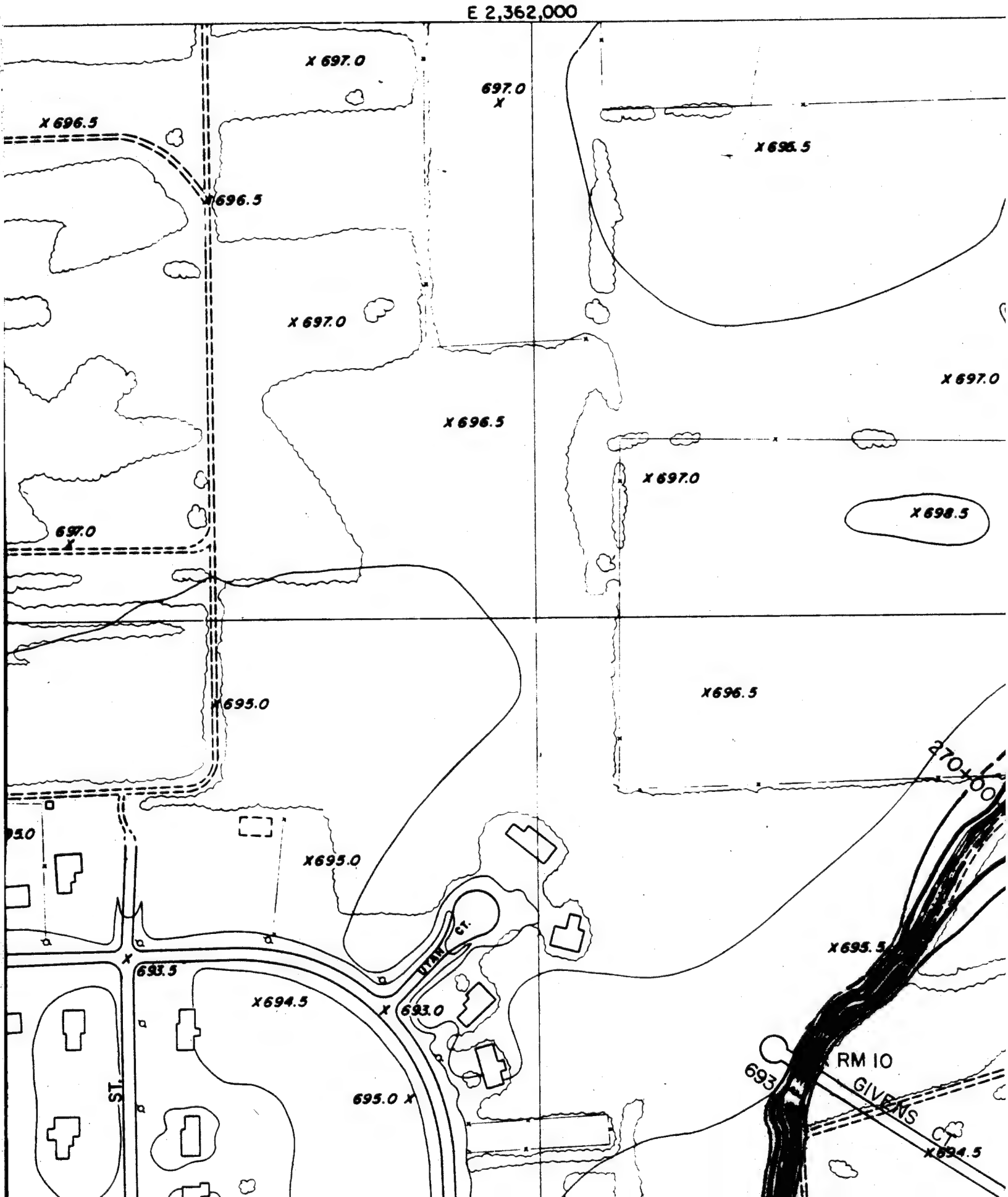
55

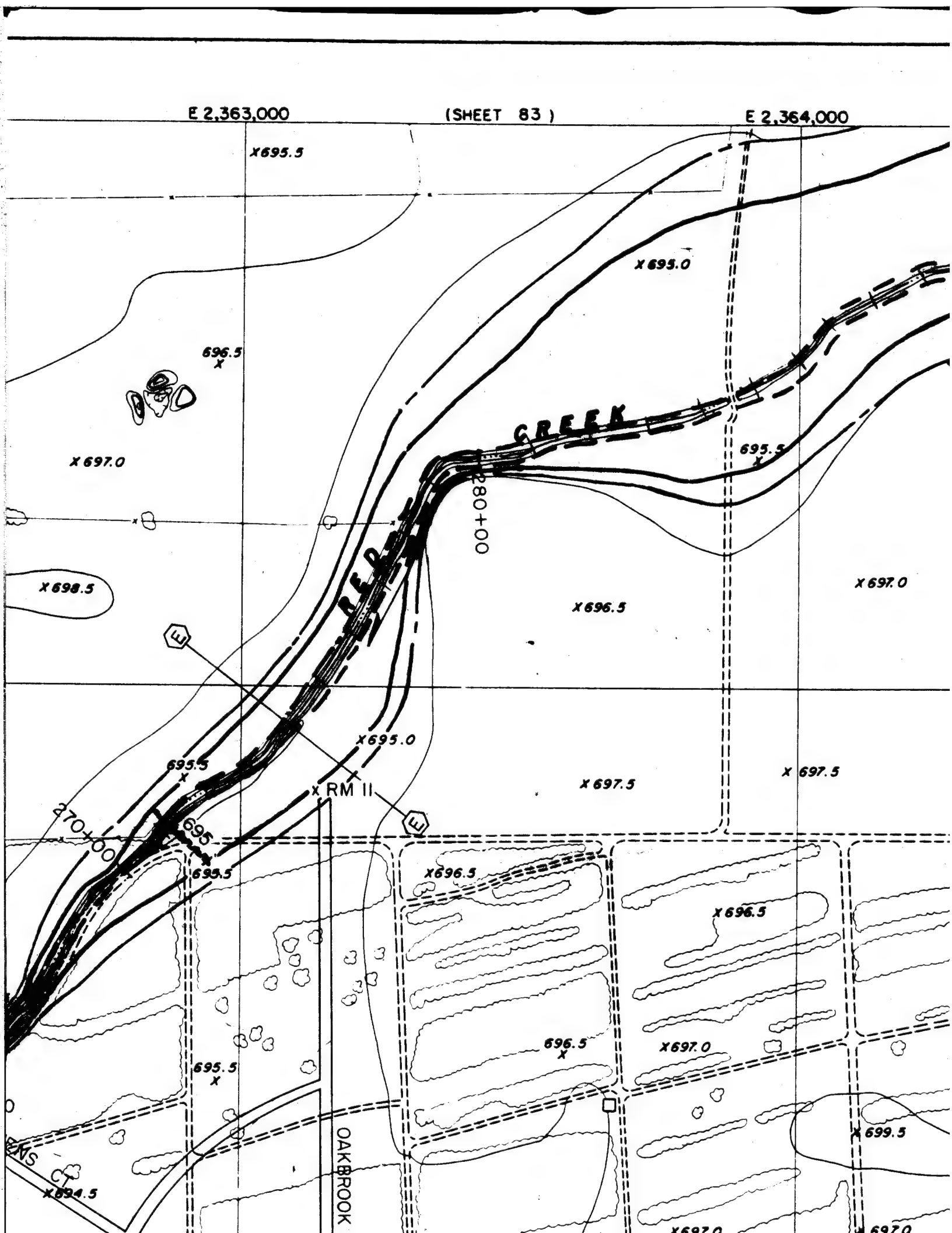
MILL CREEK

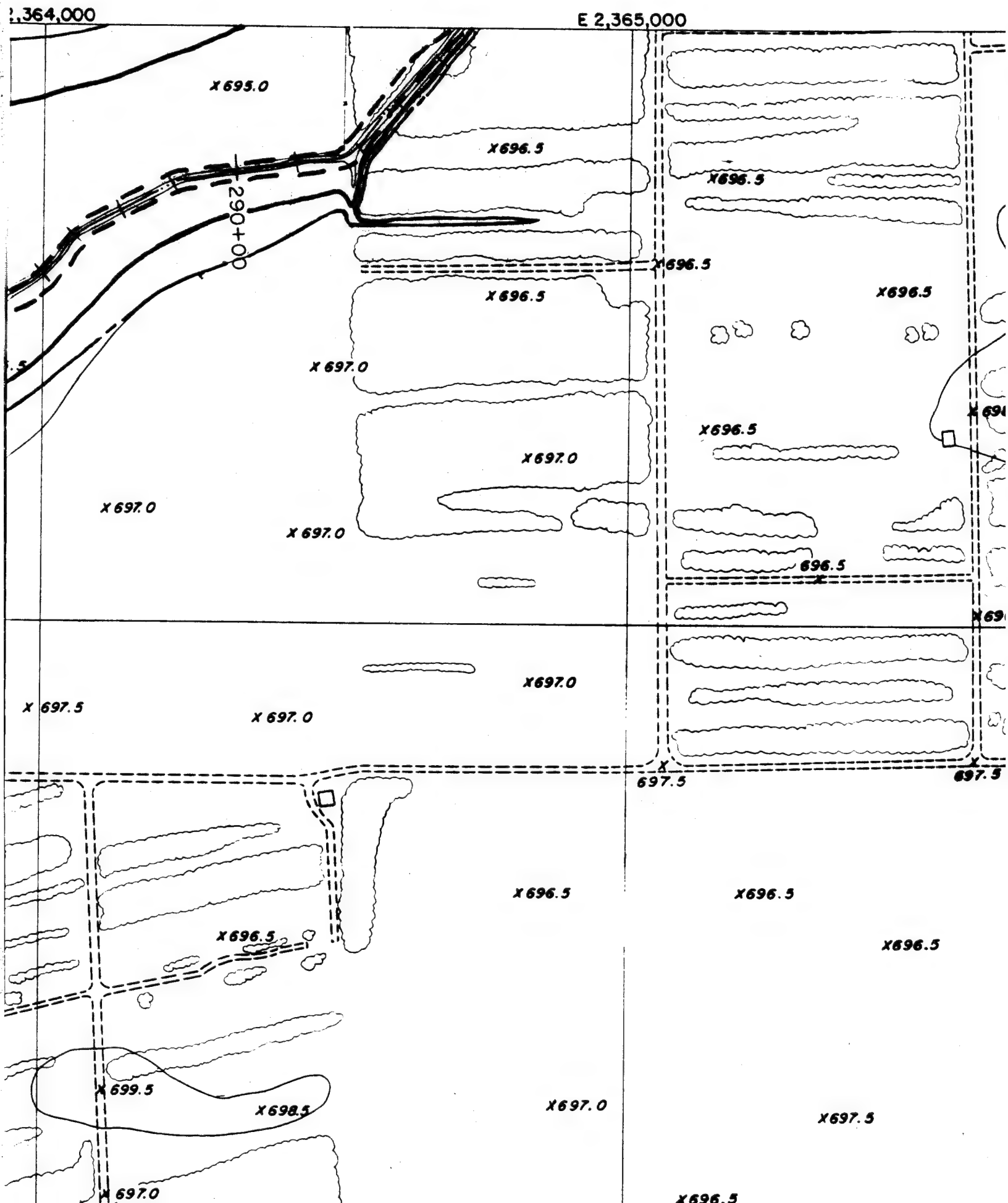
I MAP

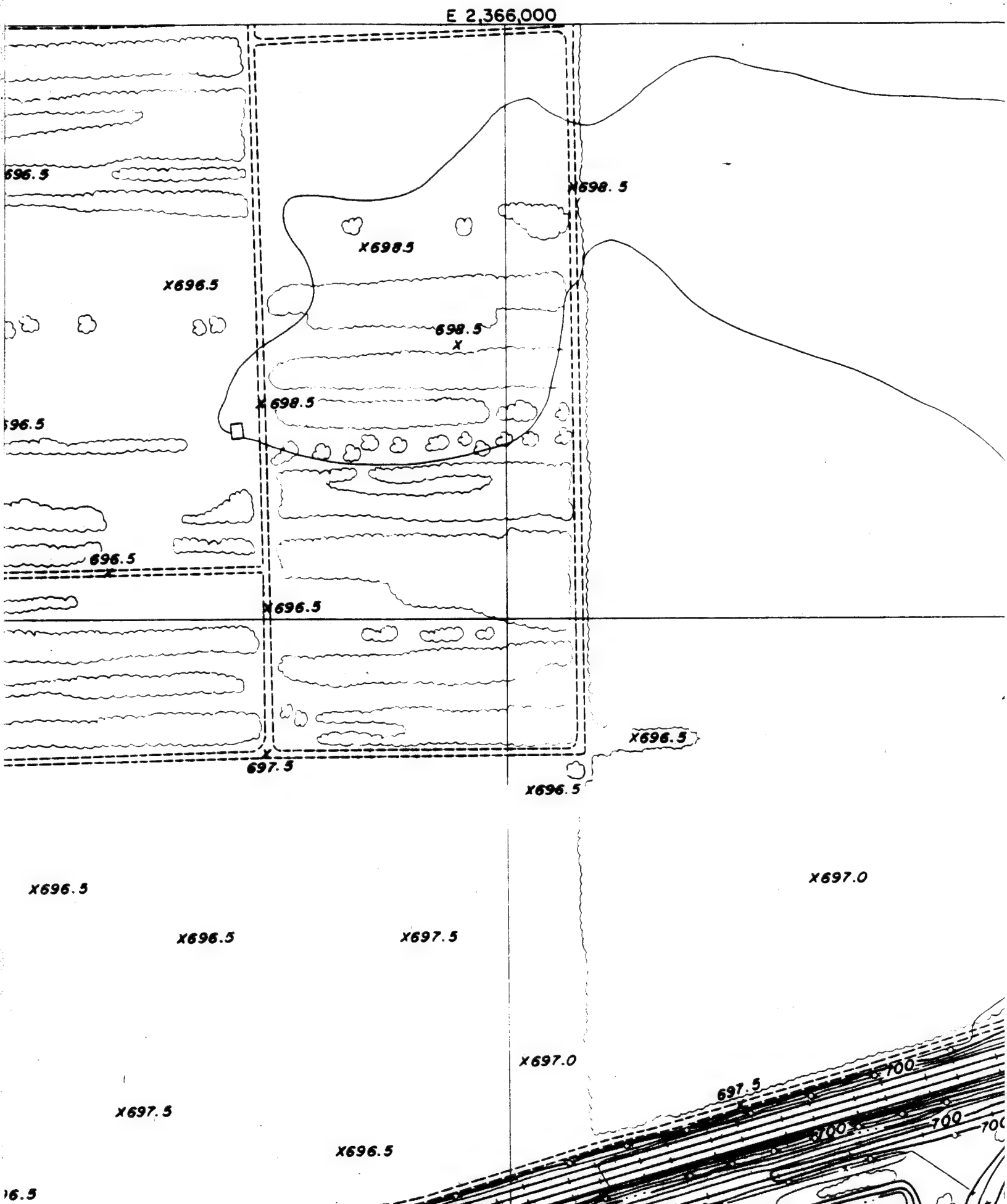
RRY, OHIO

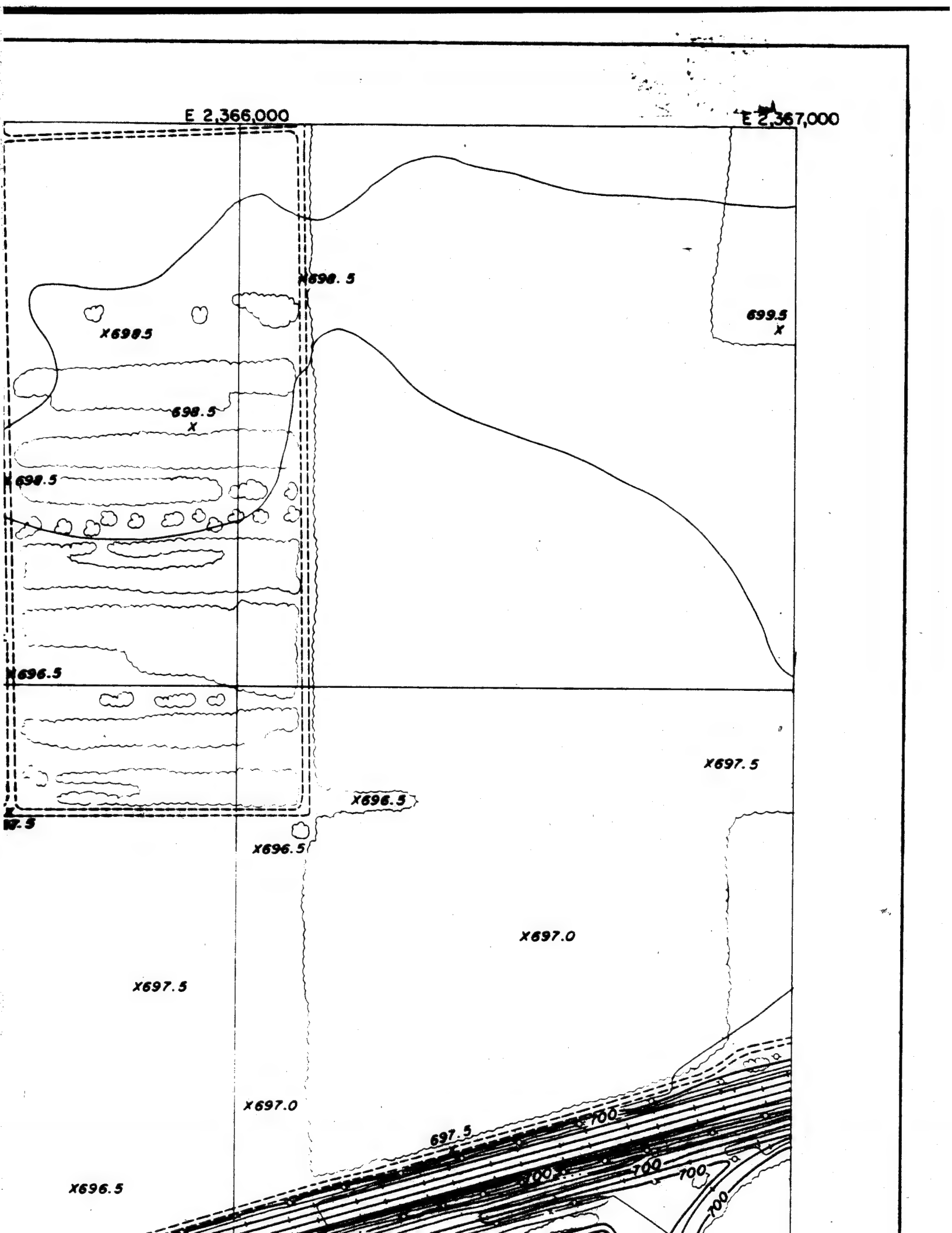

E 2,360,000
N765,000
E 2,361,000
X696.5
X696.5
X695.0
X694.5
X693.0
X695.5
X697.0
697.0
X696.5
N764,000
700.5
700
X694.5
X695.5
X695.0
X694.5
X692.5
X693.0
X692.5

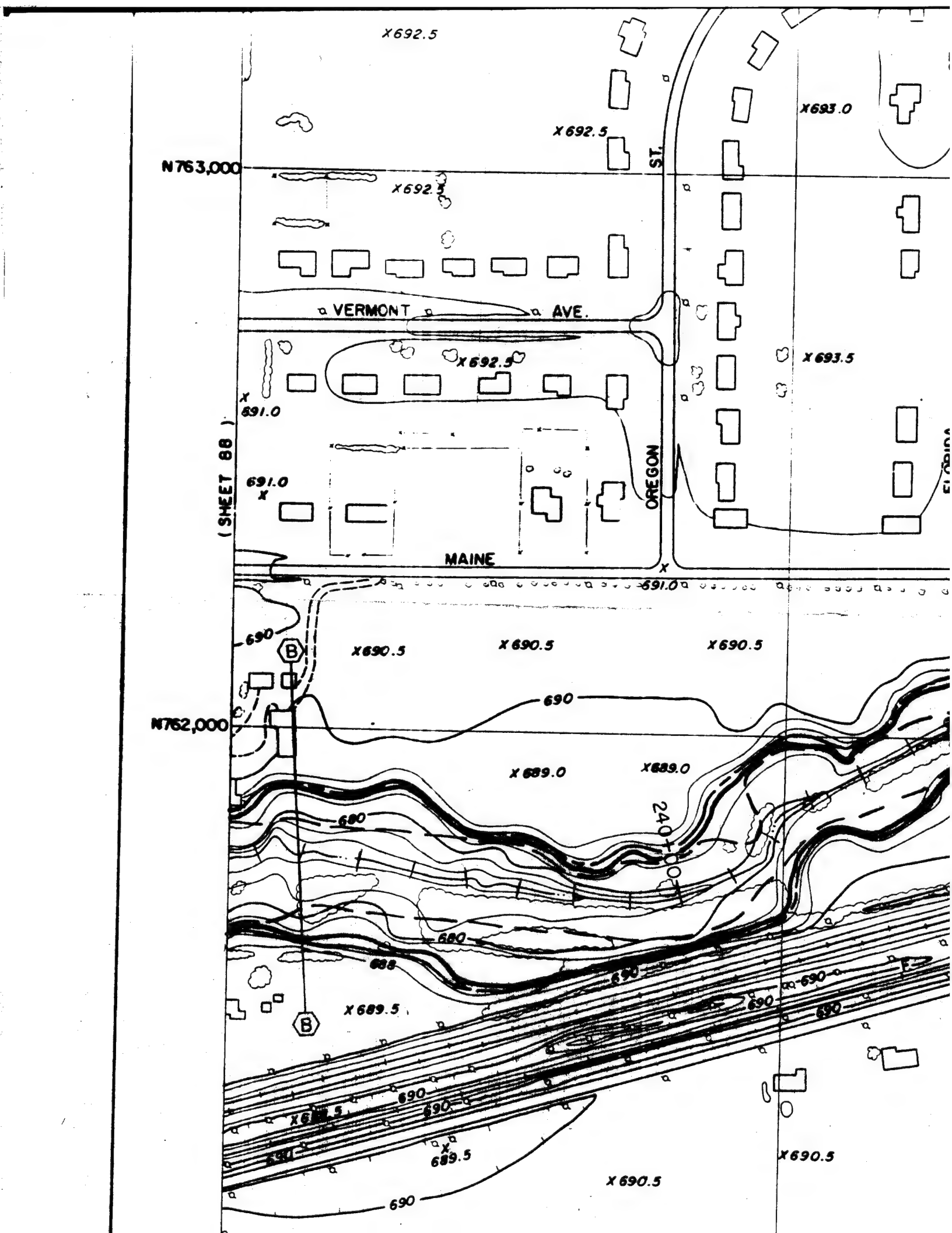

E 2,362,000
X 697.0
697.0
X 696.5
X 695.5
696.5
X 697.0
X 697.0
X 696.5
X 697.0
X 698.5
697.0
X 695.0
X 696.5
X695.0
X695.0
693.5
X694.5
693.0
695.0 X
ST.
ULLIN CT.
X 695.5
RM 10
693
GIVENS CT.
X 694.5

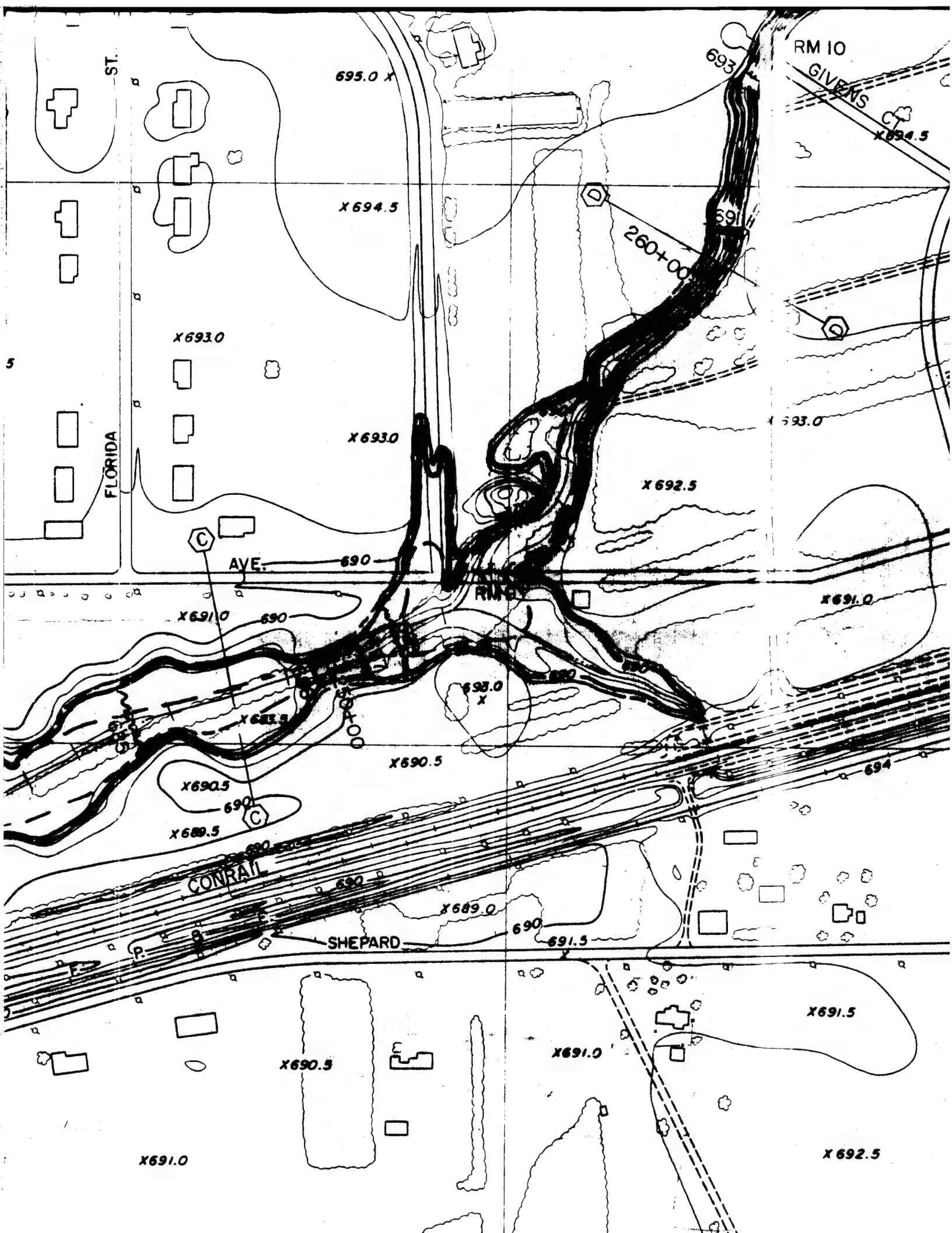

E 2,363,000
(SHEET 83)
E 2,364,000
X695.5
X695.0
696.5
X
X697.0
CREEK
695.5
X
280+00
X698.5
X696.5
X697.0
X695.0
695.5
X
RM II
X697.5
X697.5
270+00
695
695.5
X696.5
X696.5
696.5
X
X697.0
695.5
X
X699.5
OAKBROOK
X694.5
X697.0
697.0

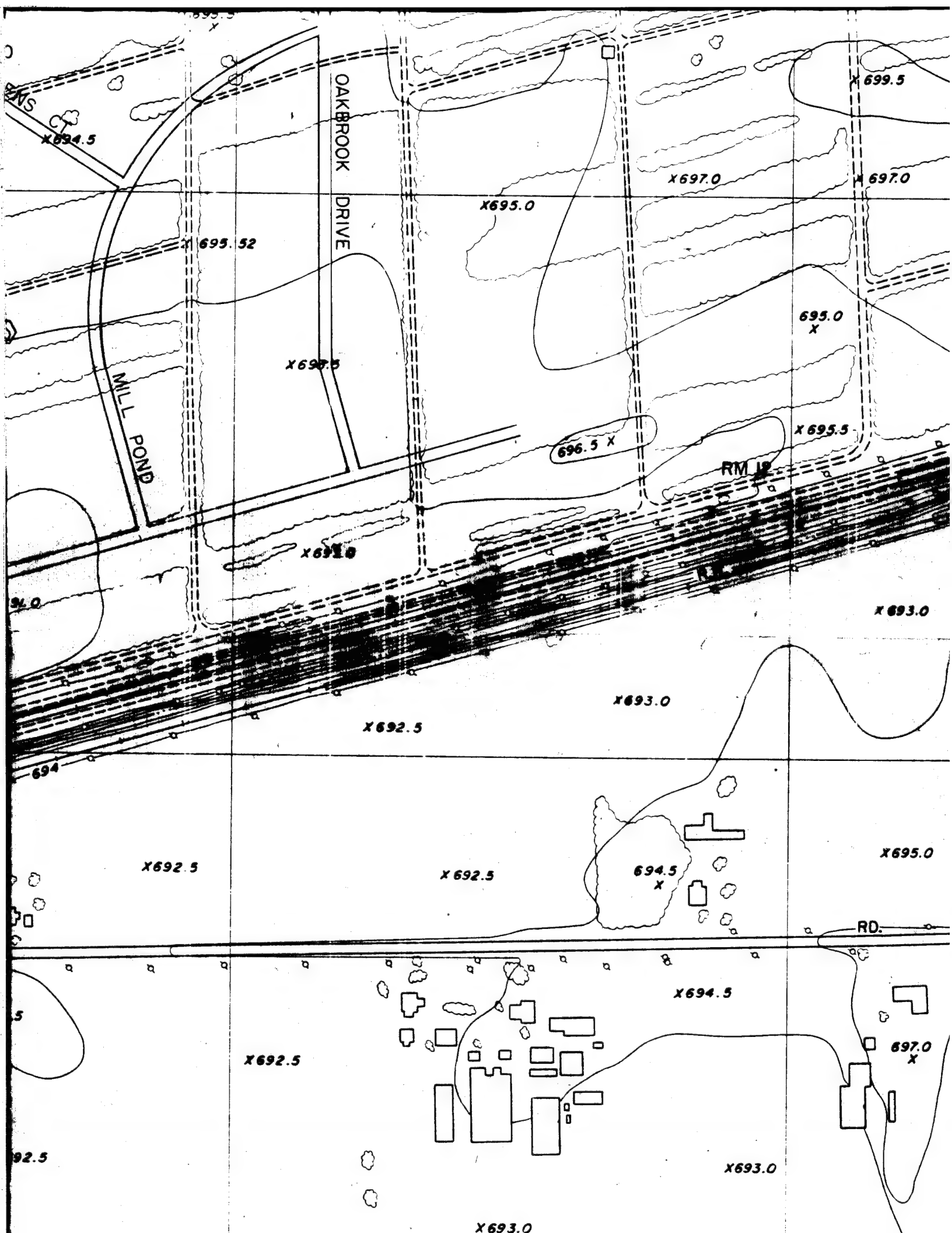

E 2,365,000
290+00
X 695.0
X 696.5
X 696.5
X 696.5
X 696.5
X 696.5
X 697.0
X 697.0
X 697.0
X 697.0
X 697.0
X 697.5
X 697.0
X 697.5
X 697.5
X 696.5
X 696.5
X 696.5
X 696.5
X 699.5
X 698.5
X 697.0
X 697.5
X 697.0
X 696.5

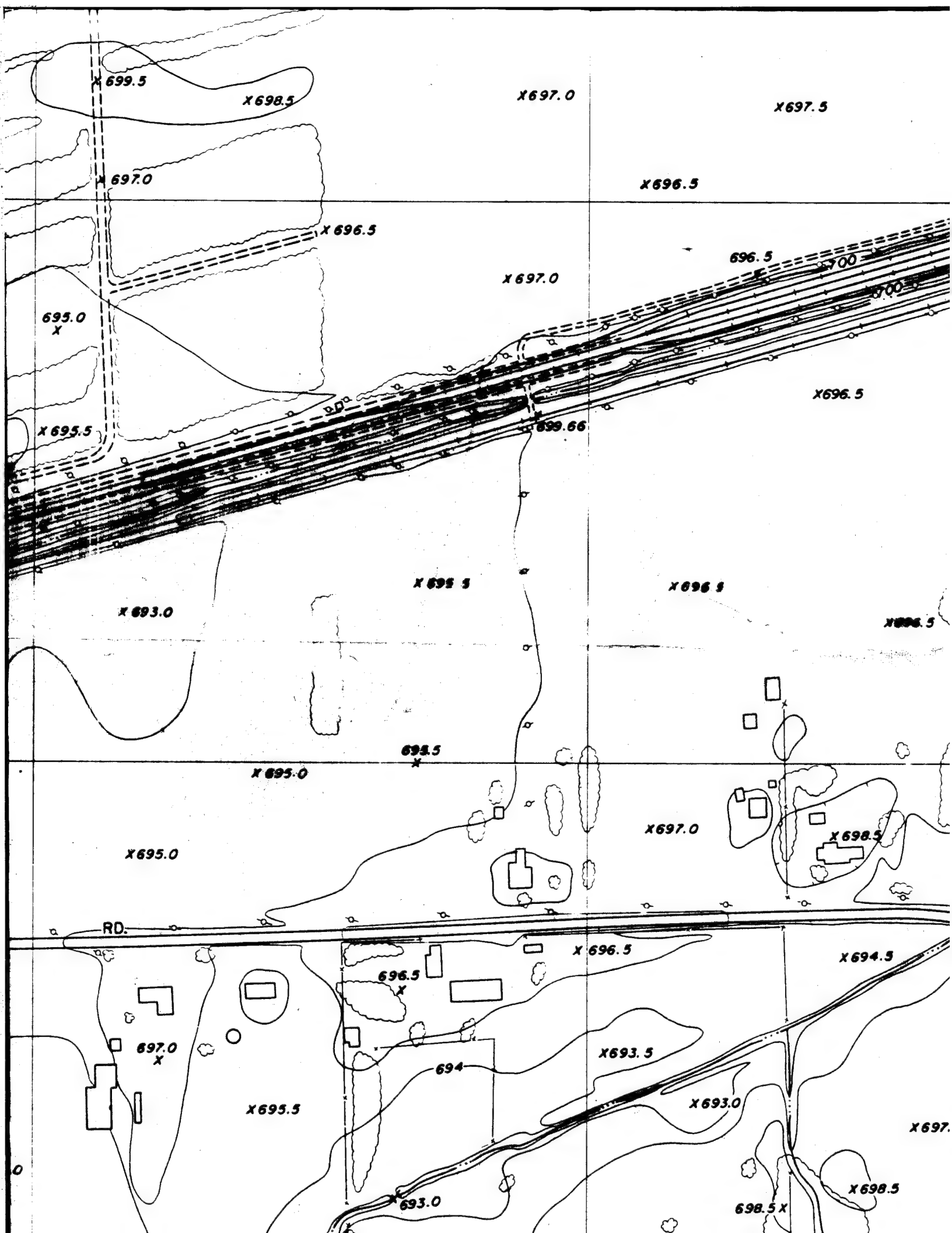

E 2,366,000
696.5
X698.5
X698.5
X696.5
698.5
X
X698.5
696.5
696.5
X696.5
697.5
X696.5
X696.5
X697.0
X696.5
X696.5
X697.5
X697.0
697.5
700
700
700
X697.5
X696.5

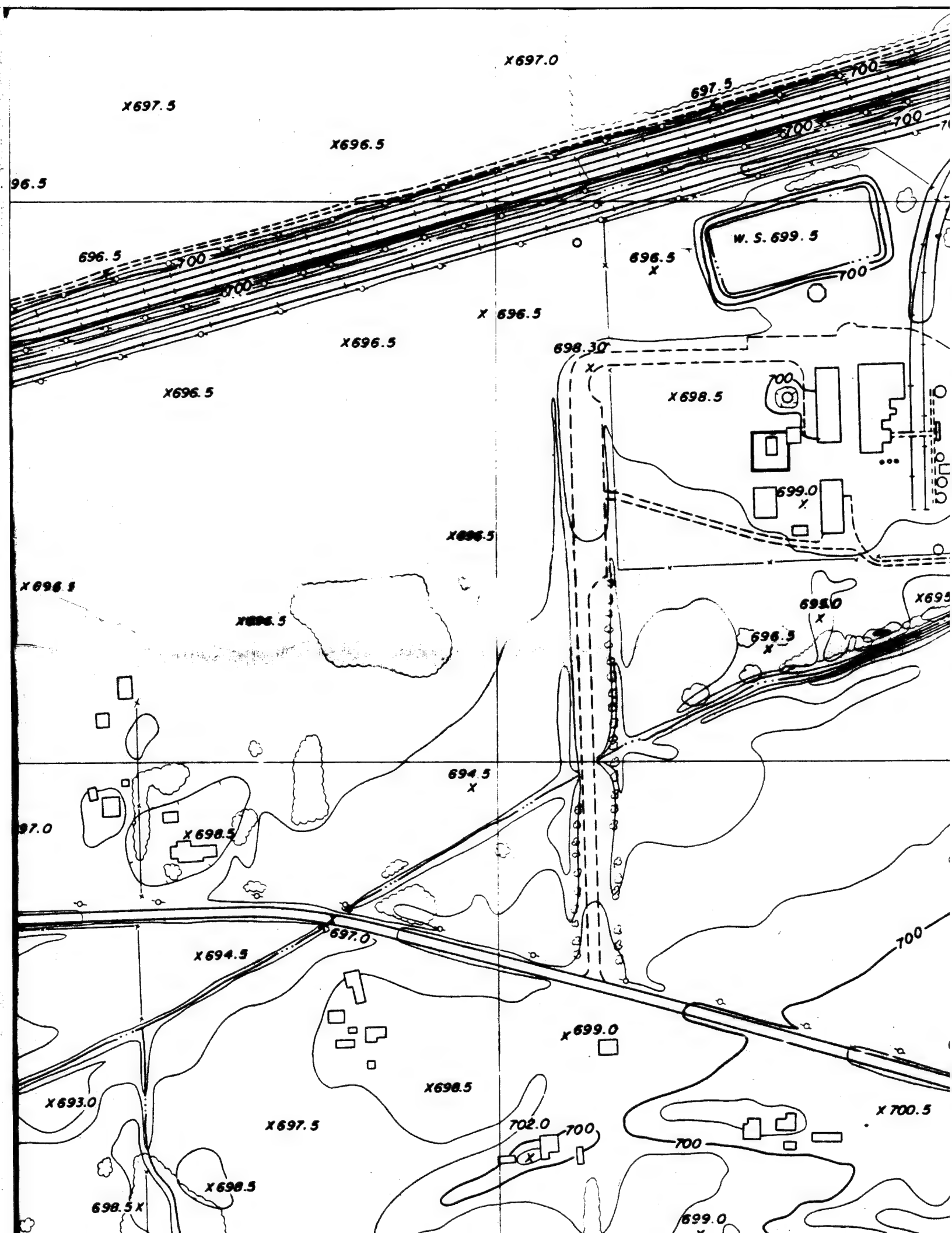

E 2,366,000
E 2,367,000
X698.5
X698.5
699.5
X
698.5
X
X698.5
X696.5
X697.5
X696.5
X696.5
X697.0
X697.5
X697.0
697.5
700
700
700
700
X696.5

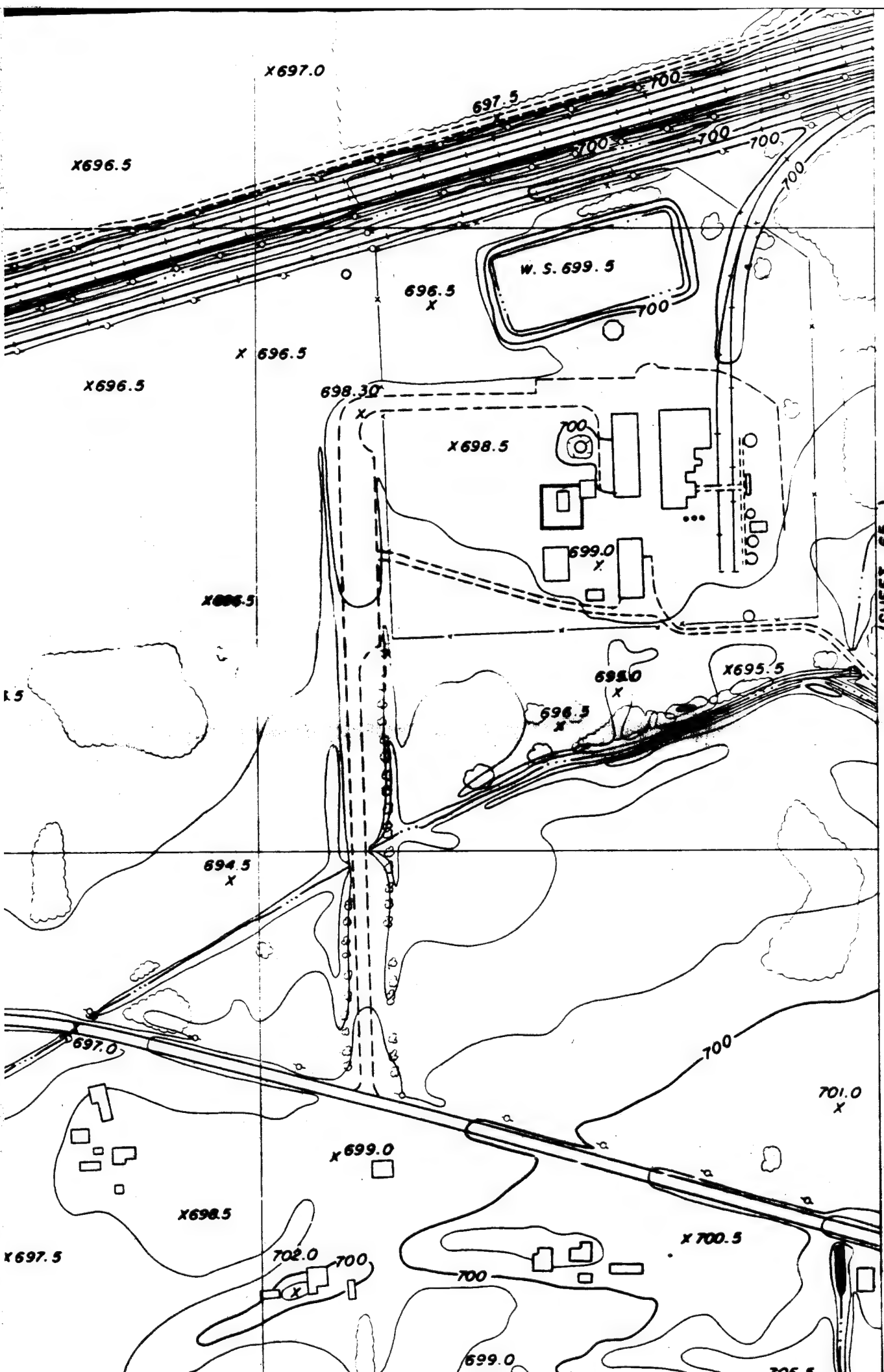

X692.5
X692.5
X693.0
N763,000
X692.5
ST.
VERMONT
AVE.
X692.5
X693.5
X
691.0
691.0
X
(SHEET 88)
OREGON
MAINE
X
691.0
690
X690.5
X690.5
X690.5
B
690
N762,000
X689.0
X689.0
240
680
680
688
690
690
690
690
X689.5
B
690
690
690
X689.5
X690.5
X690.5
690

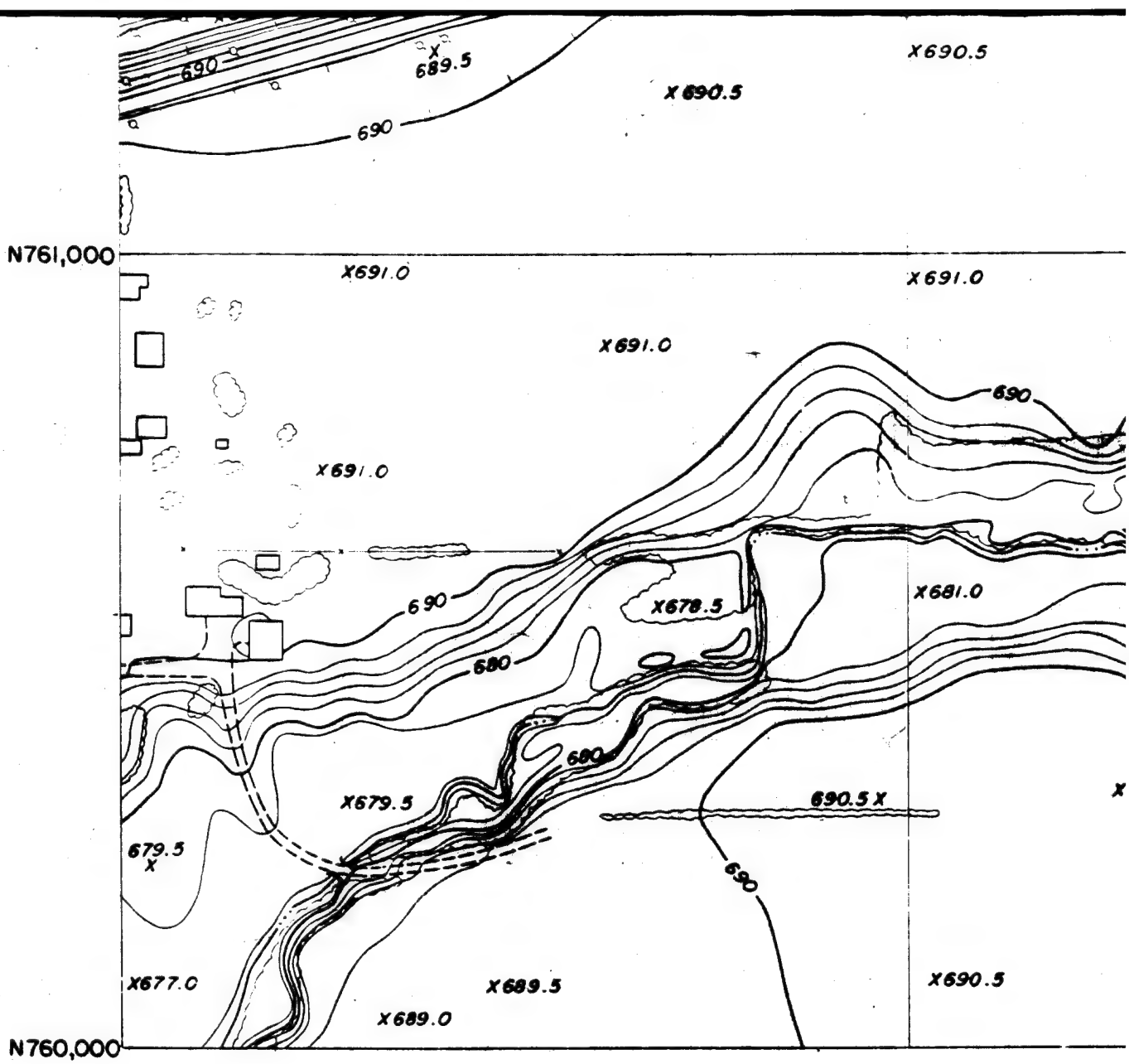

RM 10
GIVENS
ST.
FLORIDA
AVE.
CONRAIL
SHEPARD
260+00
695.0 X
X694.5
X693.0
X692.5
X691.0
X690.5
X689.5
693
691
690
694
691.5


OAKBROOK DRIVE
MILL POND
RM 12
RD.
X699.5
X697.0
X697.0
X695.0
X695.52
695.0
X
X695.5
696.5 X
X693.0
X693.0
X692.5
694
X692.5
X692.5
694.5
X
X695.0
X694.5
X692.5
697.0
X
X693.0
X693.0


699.5
698.5
697.0
697.5
697.0
696.5
696.5
696.5
697.0
695.0
695.5
699.66
696.5
693.0
695.0
695.0
697.0
698.5
RD.
696.5
694.5
696.5
697.0
694
693.5
695.5
693.0
693.0
698.5
698.5


x697.0
697.5
700
x697.5
x696.5
700
700
700
96.5
696.5
700
700
W. S. 699.5
696.5
700
x 696.5
x696.5
698.30
x696.5
700
x698.5
699.0
x696.5
x696.5
695.0
x696.5
694.5
x698.5
697.0
700
x694.5
x699.0
x698.5
x693.0
x697.5
702.0
700
700
x700.5
x698.5
698.5
699.0


X697.0
697.5
700
X696.5
700
700
700
700
W. S. 699. 5
696.5
X
700
X 696.5
X696.5
698.30
X
700
X698.5
699.0
X
(SHEET 65)
X695.5
695.0
X
696.5
X
694.5
X
697.0
700
701.0
X
X699.0
X698.5
X 700.5
X697.5
702.0
700
700
699.0



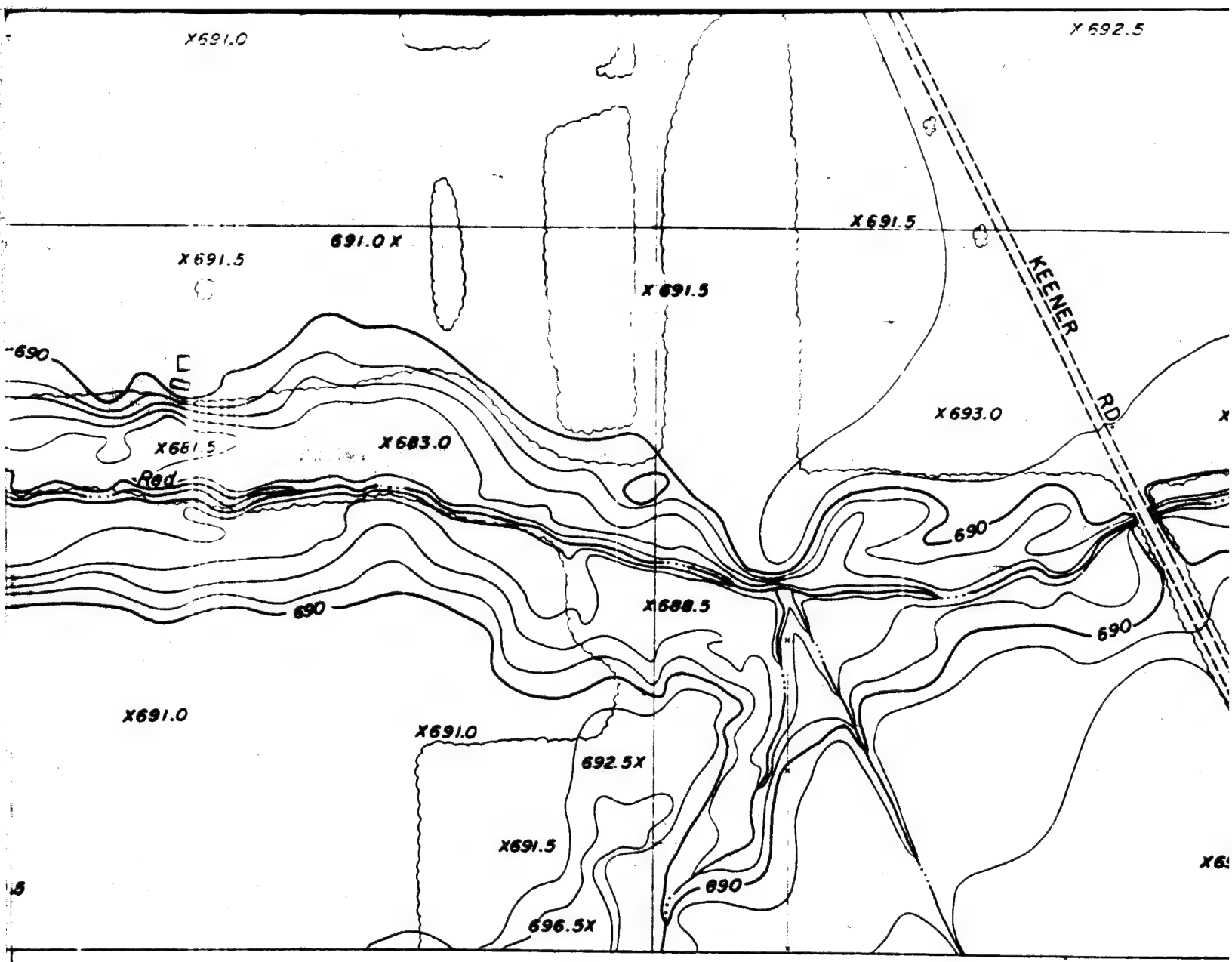
OHIO COORDINATE SYSTEM
LAMBERT GRID

ELEVATIONS ARE BASED ON
MEAN SEA LEVEL 1927
NORTH AMERICAN DATUM

PREPARED BY:
KUCERA & ASSOCIATES INC.
PHOTOGRAMMETRIC ENGINEERS
MENTOR, OHIO

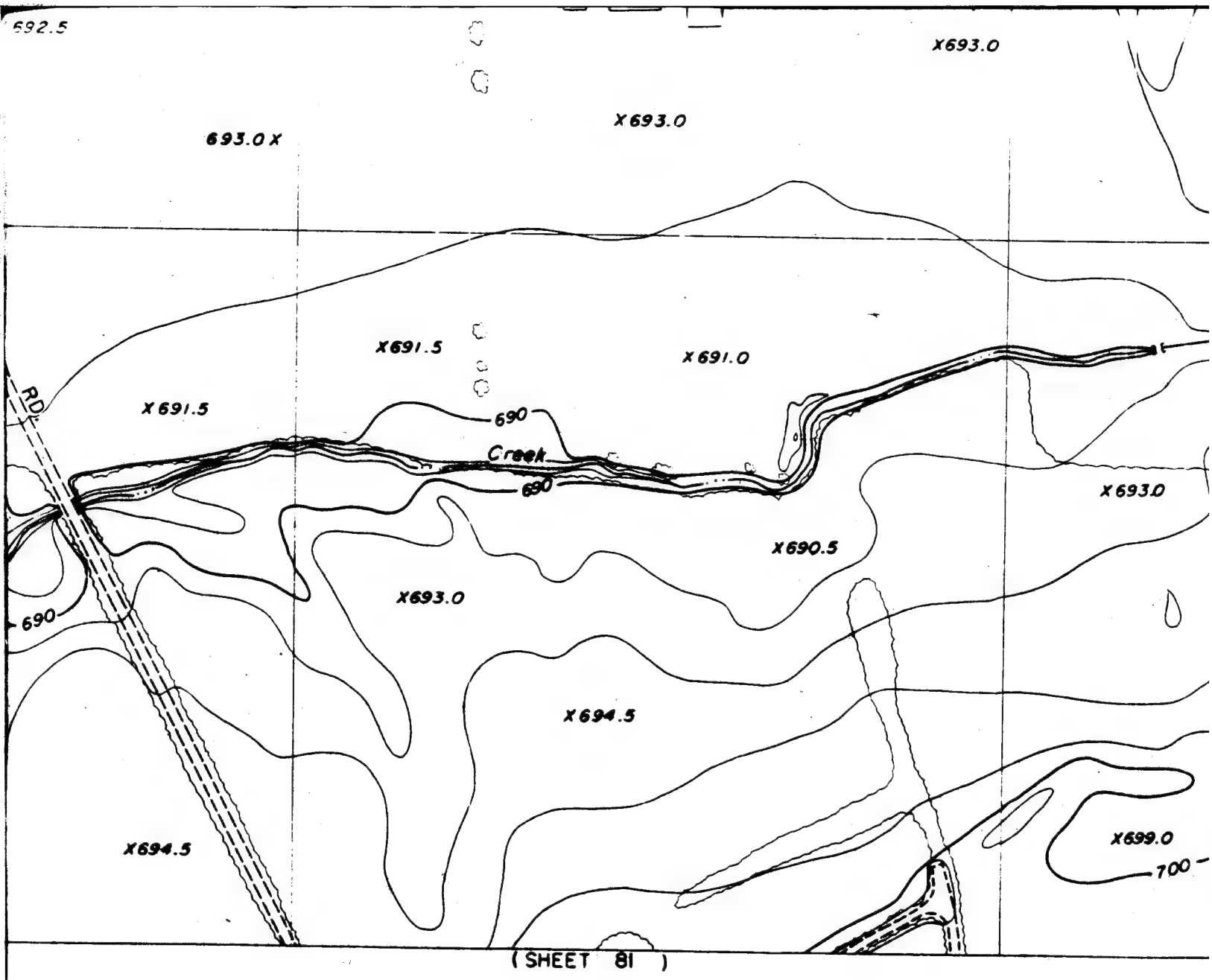
TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS

RM1



LEGEND

- 100 YEAR FLOOD LIMITS
- 500 YEAR FLOOD LIMITS
- FLOODWAY LIMITS
- (A) — (A) CROSS SECTION LOCATION
- RM1 X ELEVATION REFERENCE MARK
- HYDRAULIC BASELINE
- 650 BASE FLOOD ELEVATION

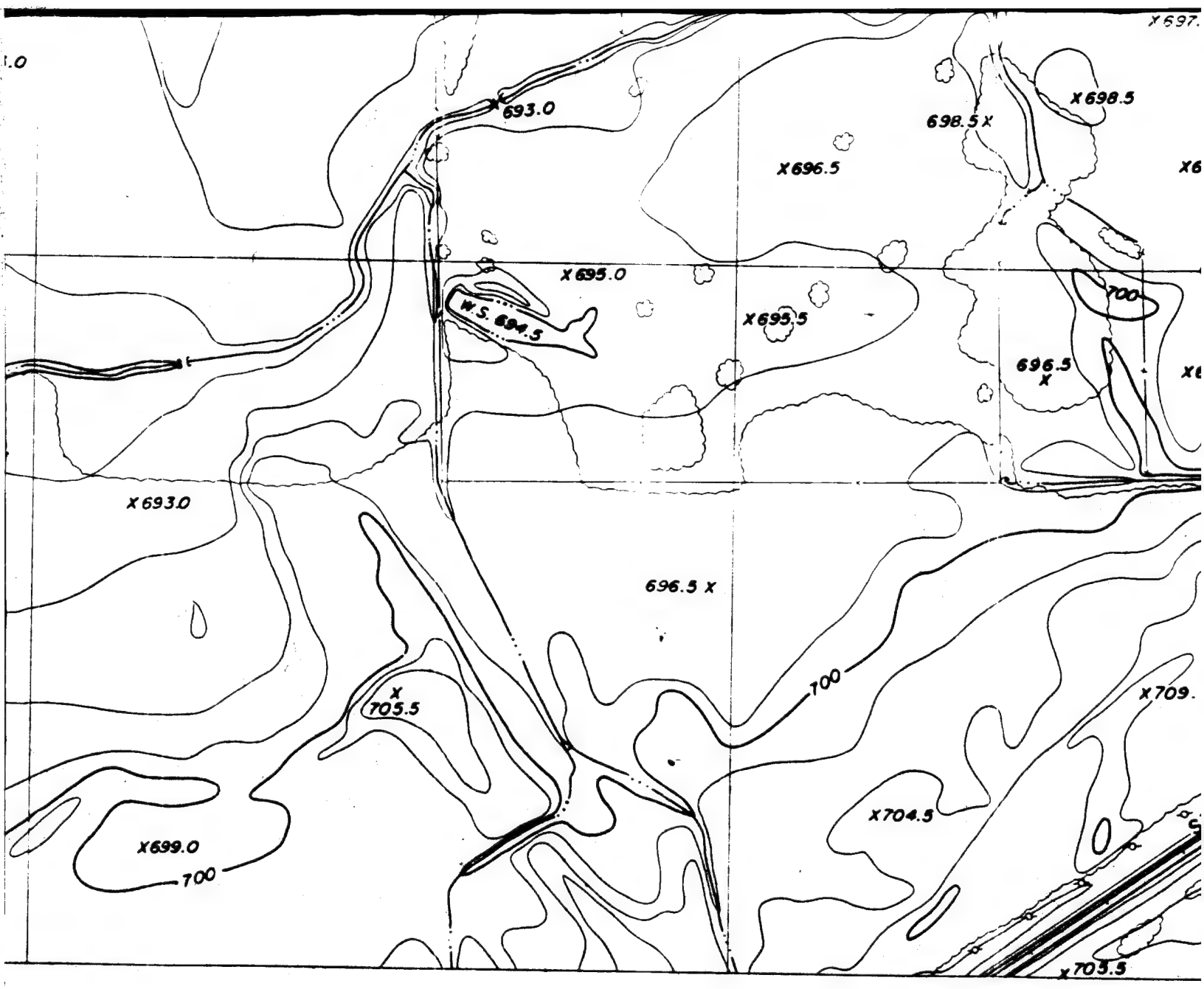


200 100 0 200 400 600 FEET

SCALE: 1" = 200' CONTOUR INTERVAL: 2'

DATE OF PHOTOGRAPHY

NOVEMBER, 1966 – JANUARY 1967



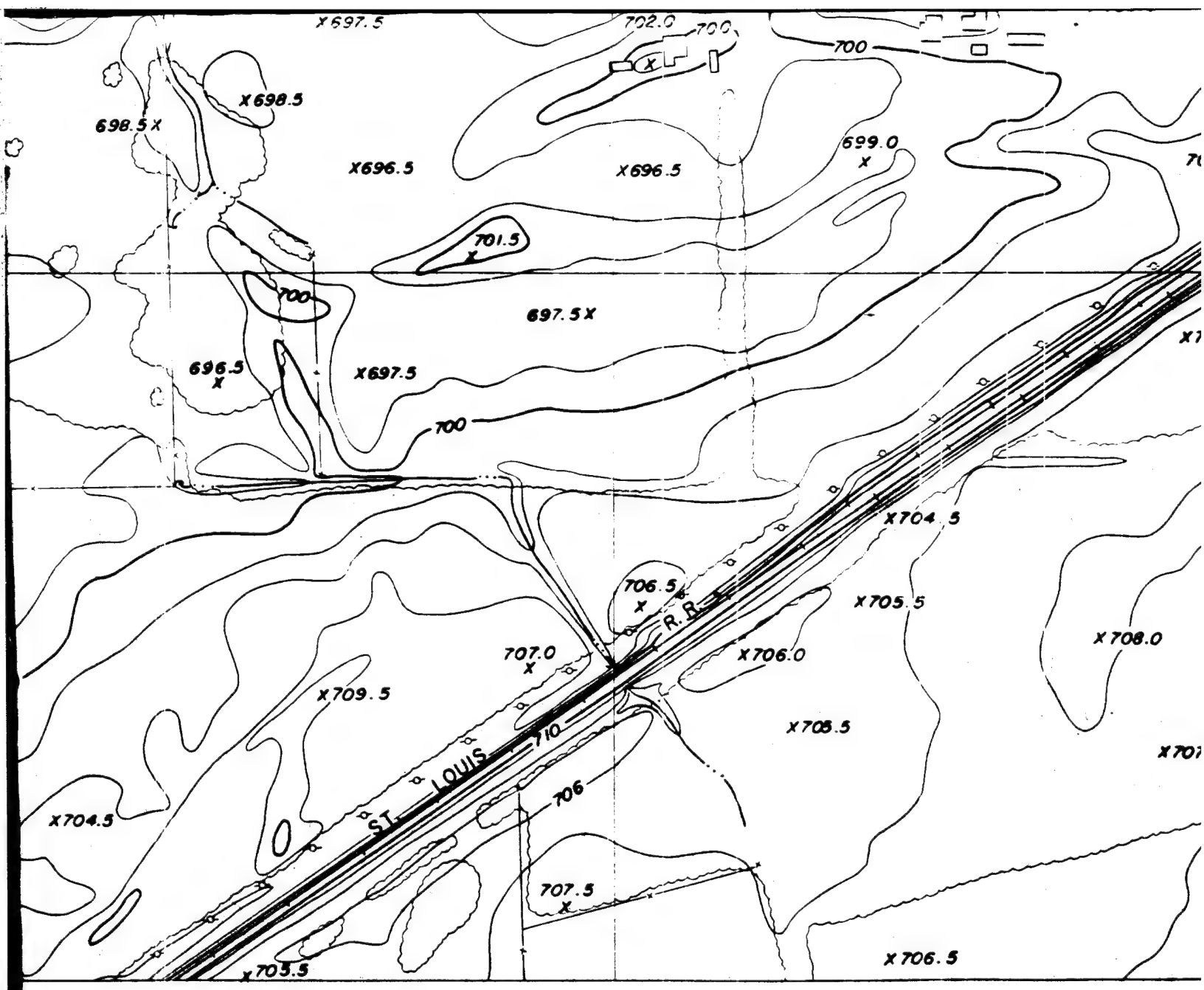
N

	83	64	56
88	82	65	55

RED CREEK - RED M

FLOODED AREA M

VILLAGE OF PERRY



LAKE COUNTY, OH

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSI

ROBERT B. FULTON, CHAIRMAN

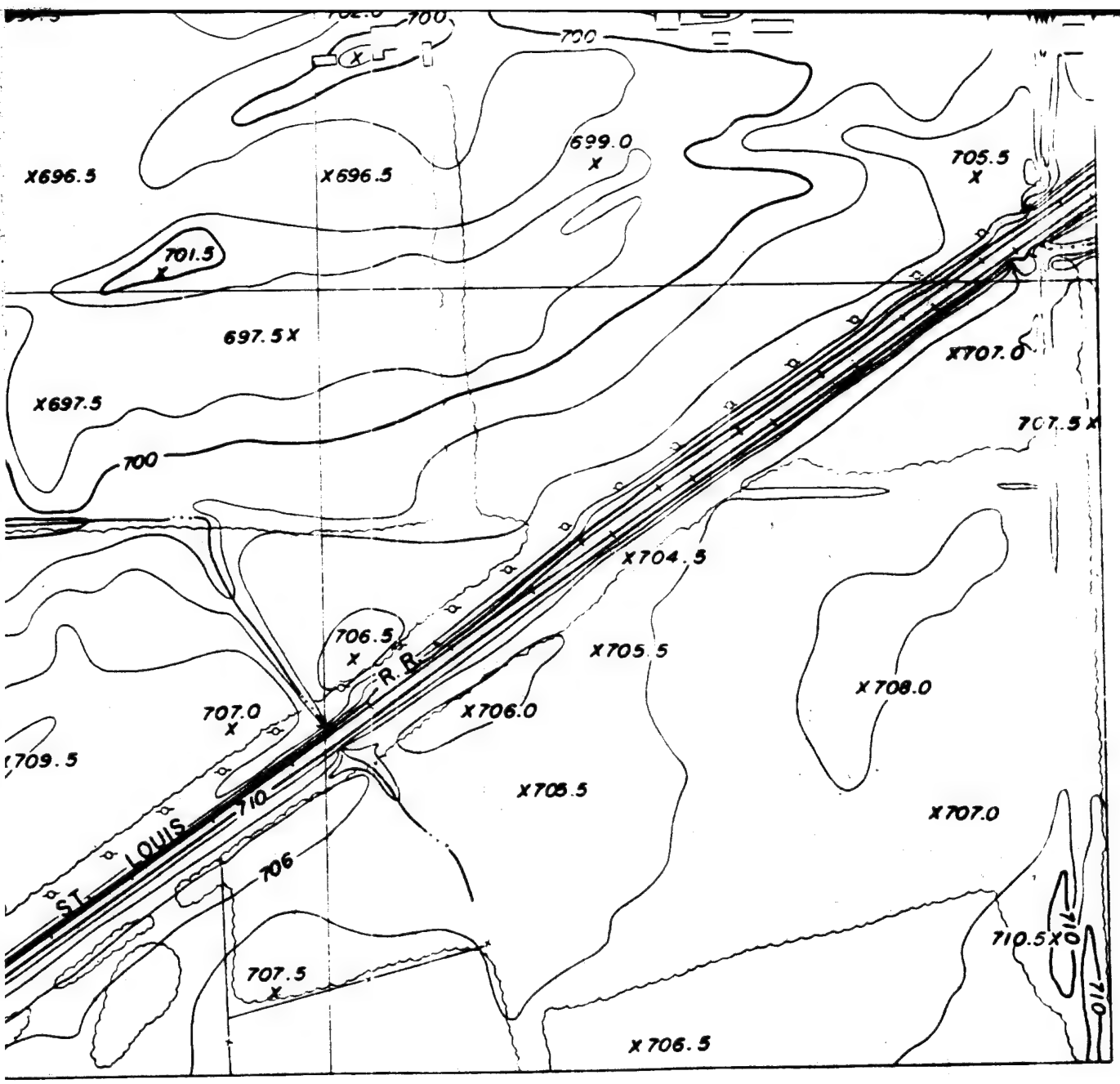
JOHN D. HADDEN – HOWARD B. BEEBE

	83	64	56
88	82	65	55

CREEK - RED MILL CREEK

FLOODED AREA MAP

VILLAGE OF PERRY, OHIO



LAKE COUNTY, OHIO

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSIONERS

ROBERT B. FULTON, CHAIRMAN

JOHN D. HADDEN – HOWARD B. BEEBE

56

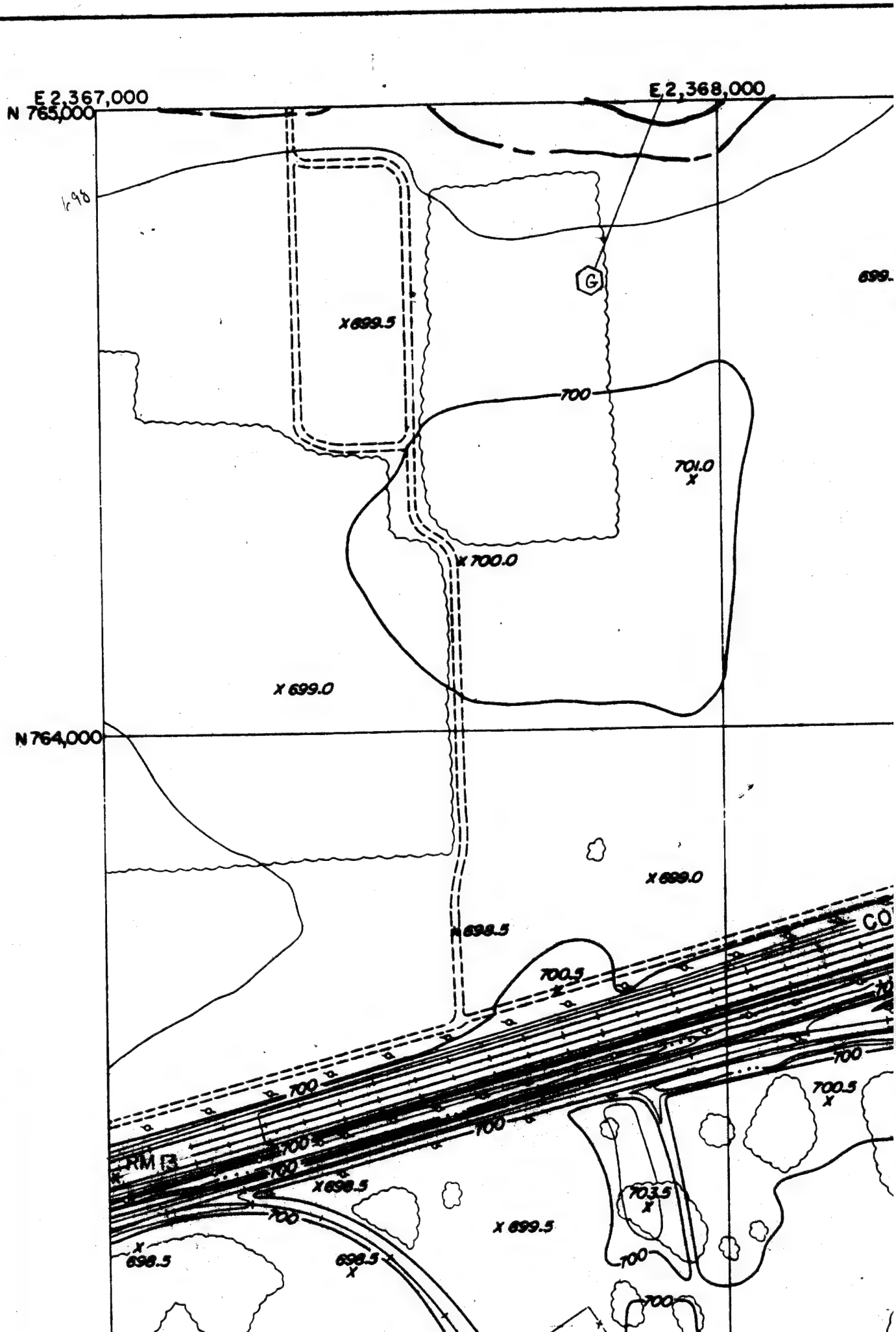
55

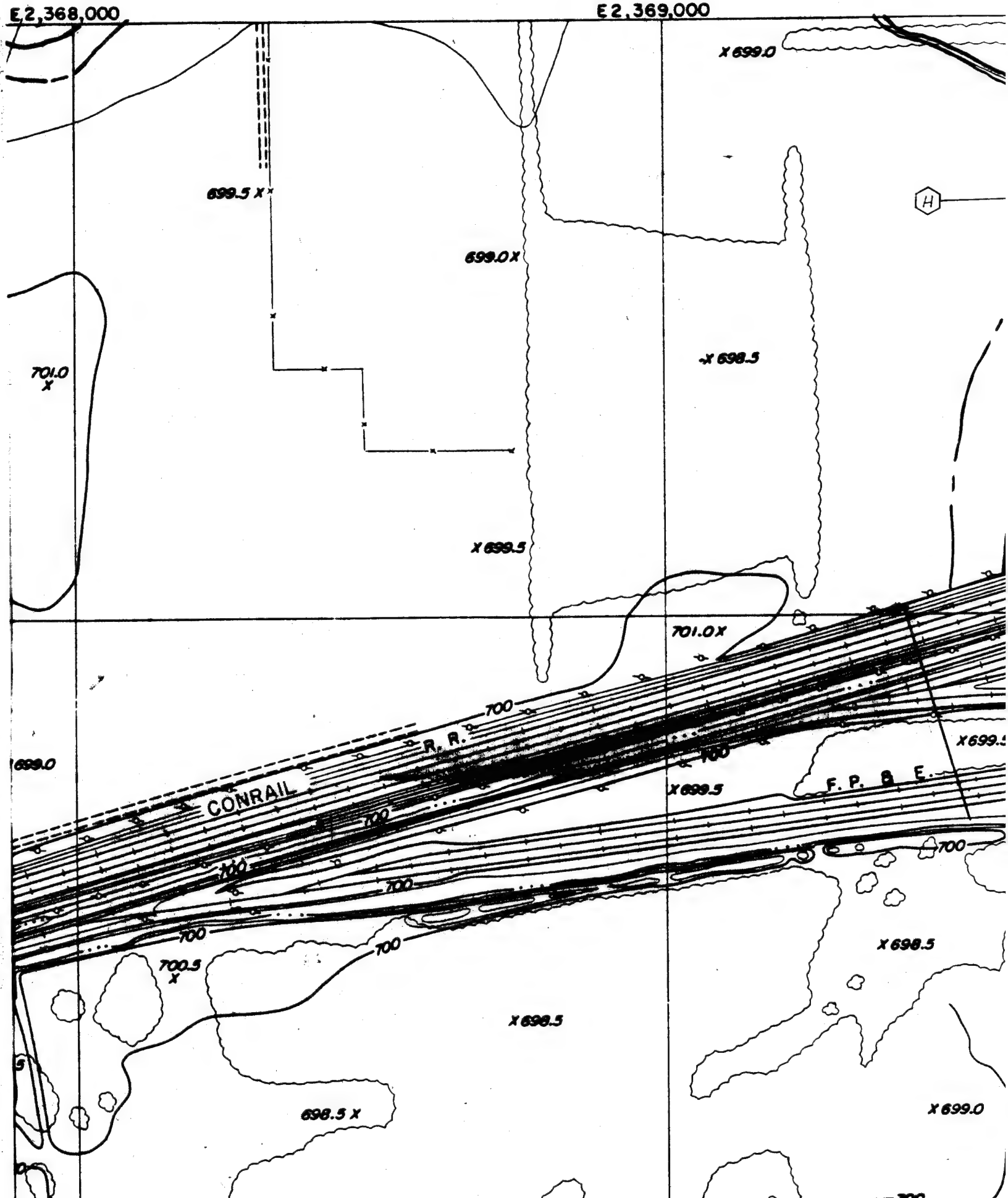
MILL CREEK

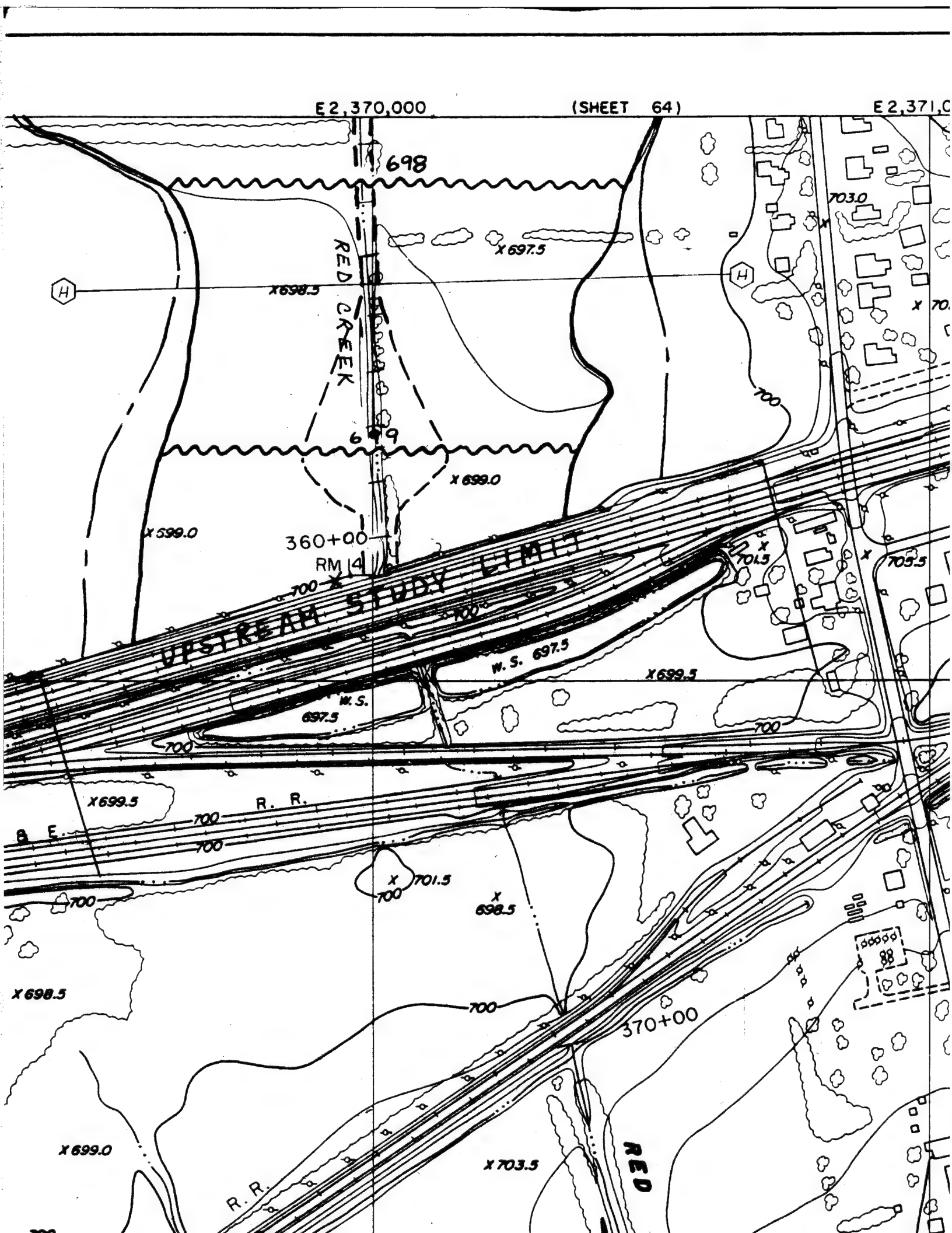
A MAP

RRY, OHIO

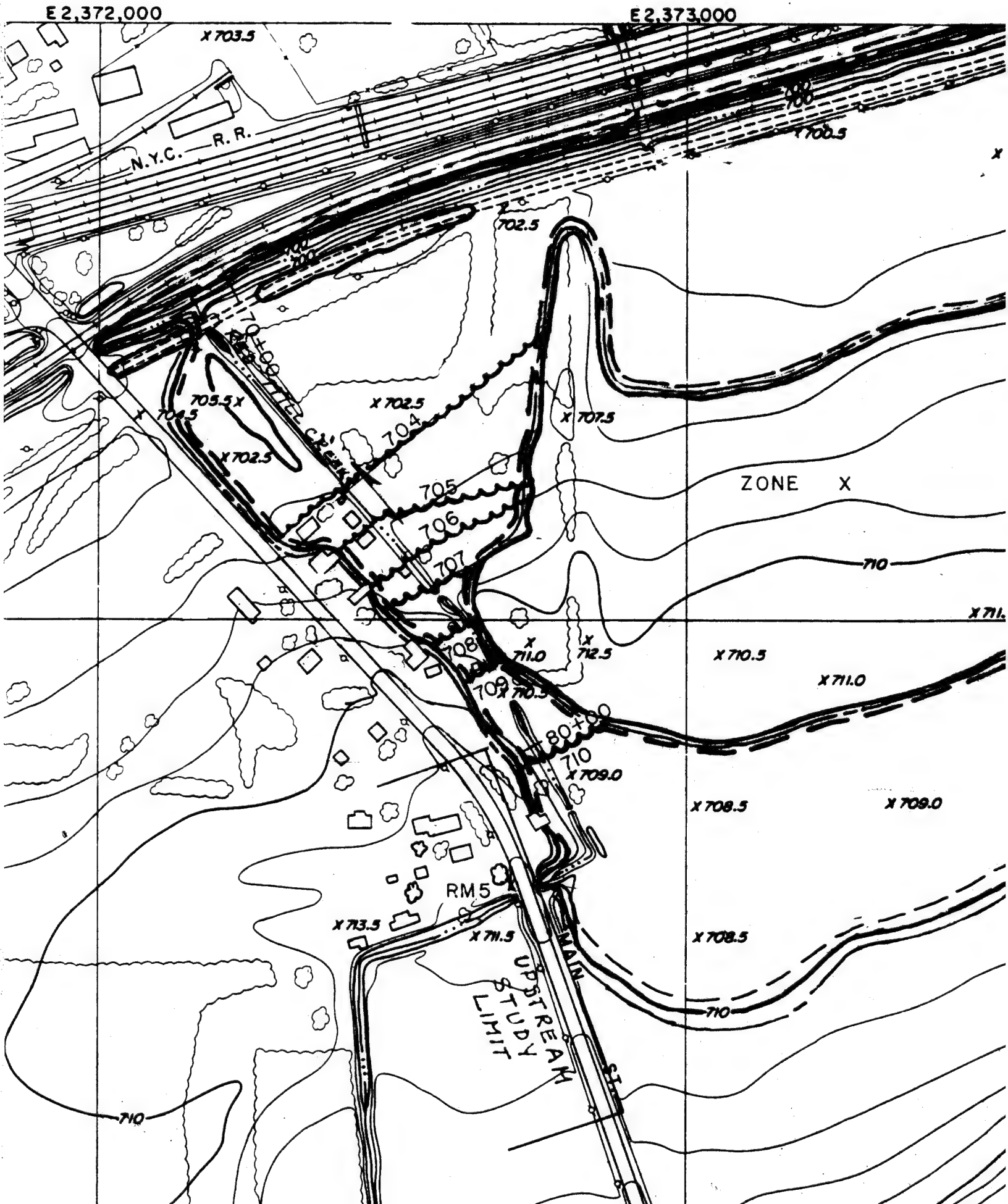
82

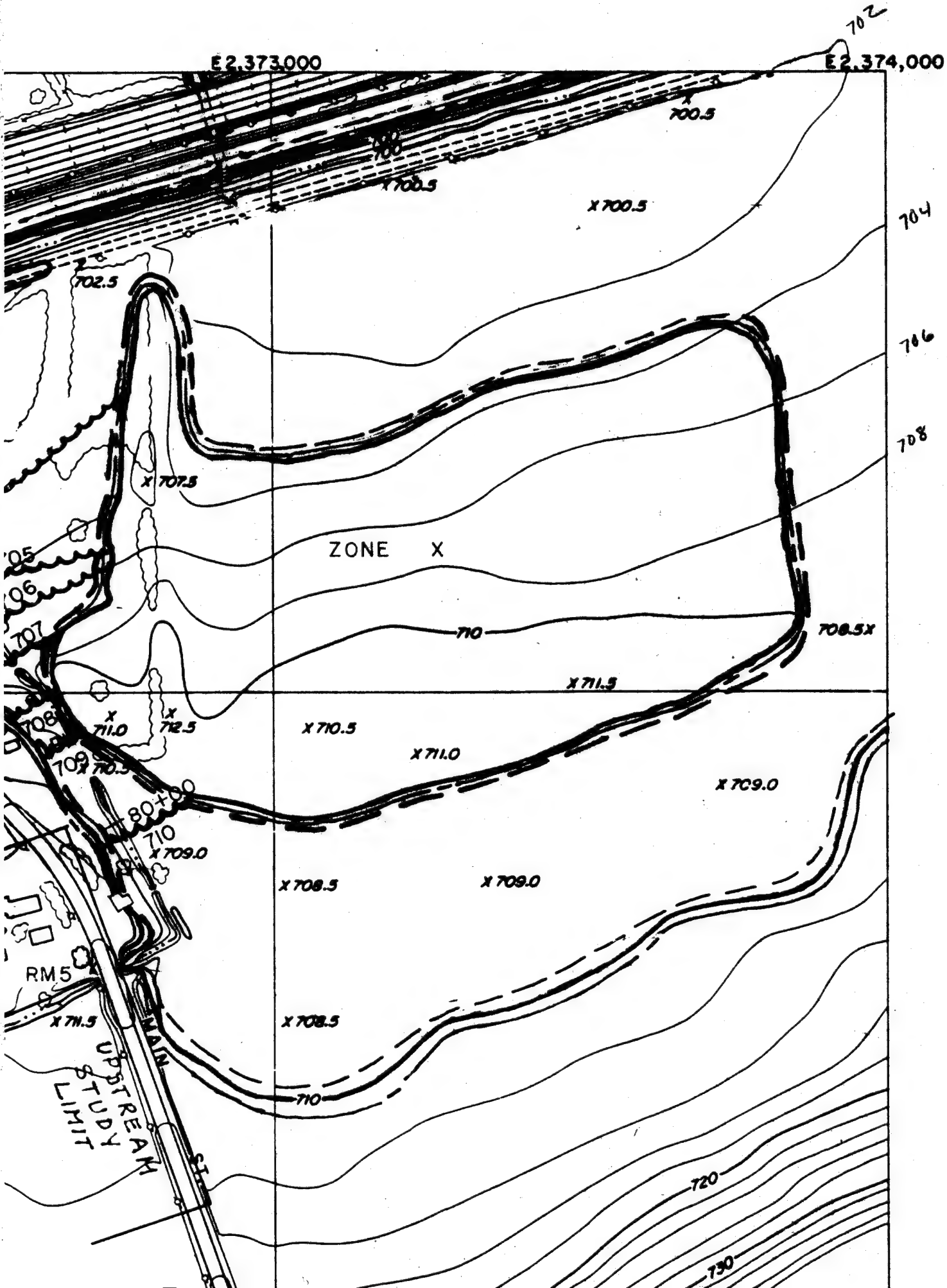

E 2,367,000
N 765,000
E 2,368,000
698
G
699.
X 699.5
700
701.0
X
X 700.0
X 699.0
N 764,000
X 699.0
X 698.5
700.5
X
700
700.5
X
700
700
700
RM 13
X 698.5
700
703.5
X
X 699.5
X
698.5
698.5
X
700
700

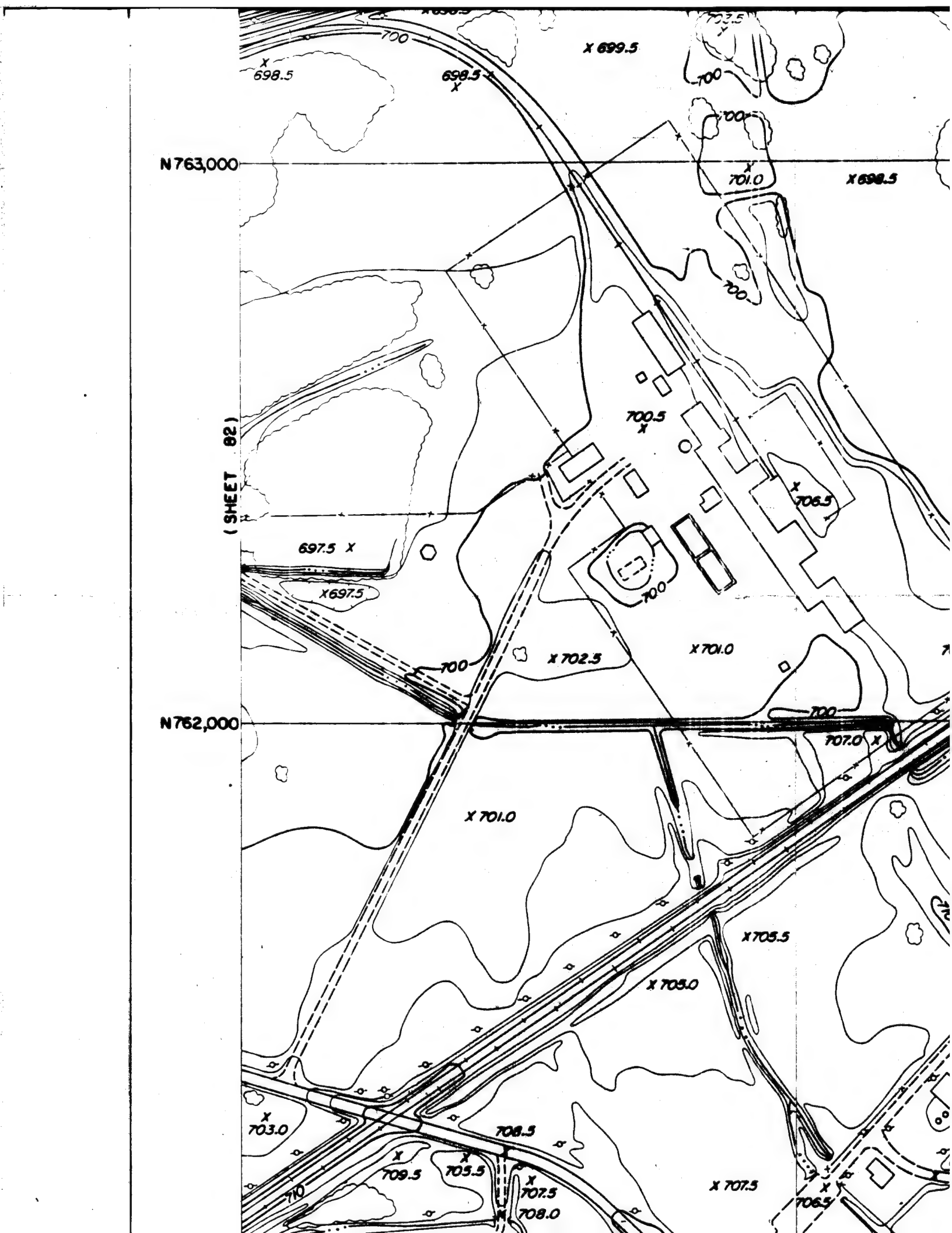

E 2,368,000
E 2,369,000
X 699.0
699.5 X
699.0 X
X 698.5
701.0 X
X 699.5
701.0 X
700
R. R.
CONRAIL
699.0
X 699.5
F. P. & E.
700
700
700
700
700
700
700.5 X
X 698.5
X 698.5
698.5 X
X 699.0
H

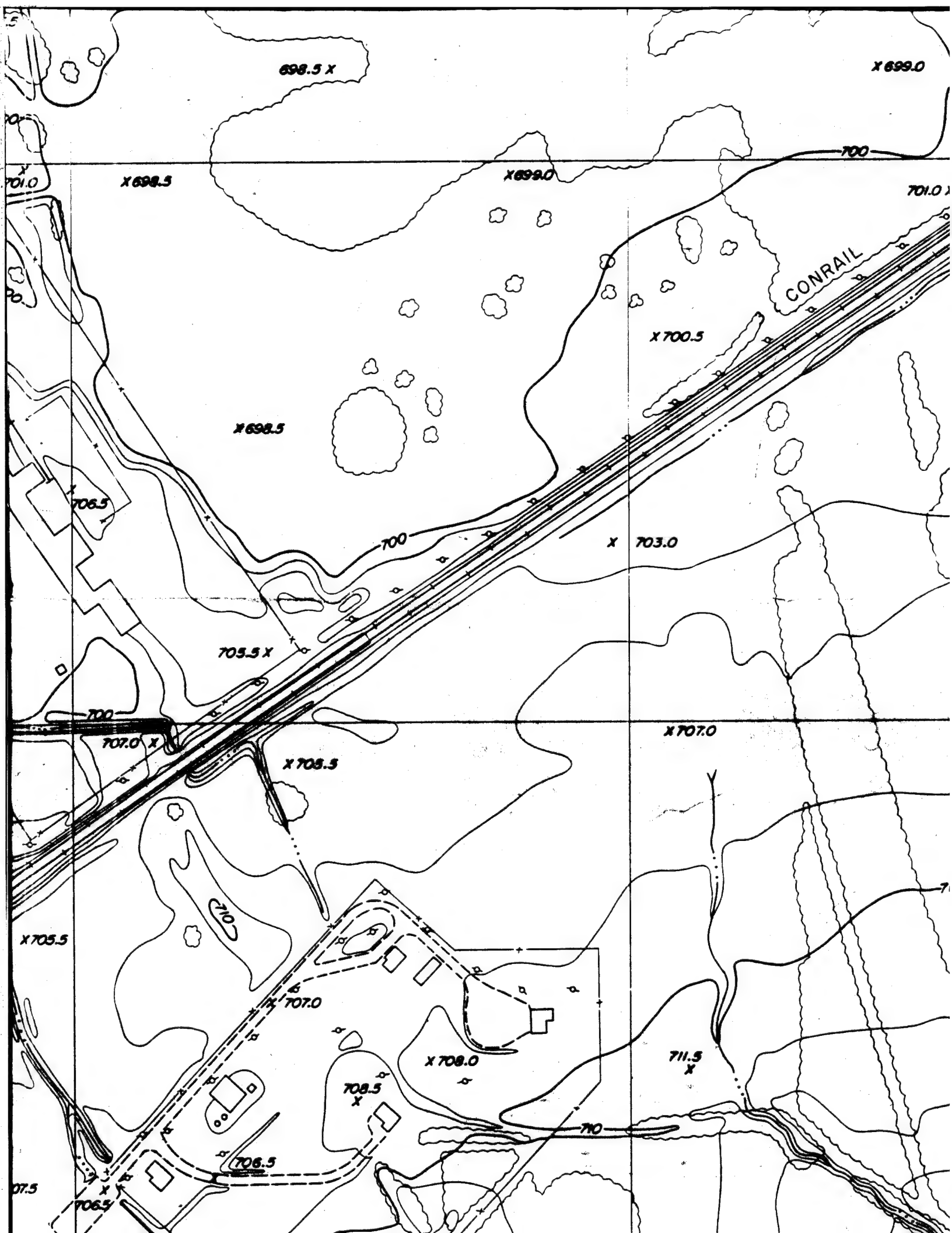

E 2,370,000
(SHEET 64)
E 2,371,0
698
703.0
X 697.5
RED CREEK
X 698.5
H
H
X 70
700
679
X 699.0
X 699.0
360+00
RM 14
700
700
UPSTREAM STUDY LIMIT
X
701.5
X
703.5
W. S. 697.5
X 699.5
W. S.
697.5
700
700
X 699.5
R. R.
B. E.
700
700
X
701.5
700
X
698.5
X 698.5
700
370+00
X 699.0
R. R.
X 703.5
RED

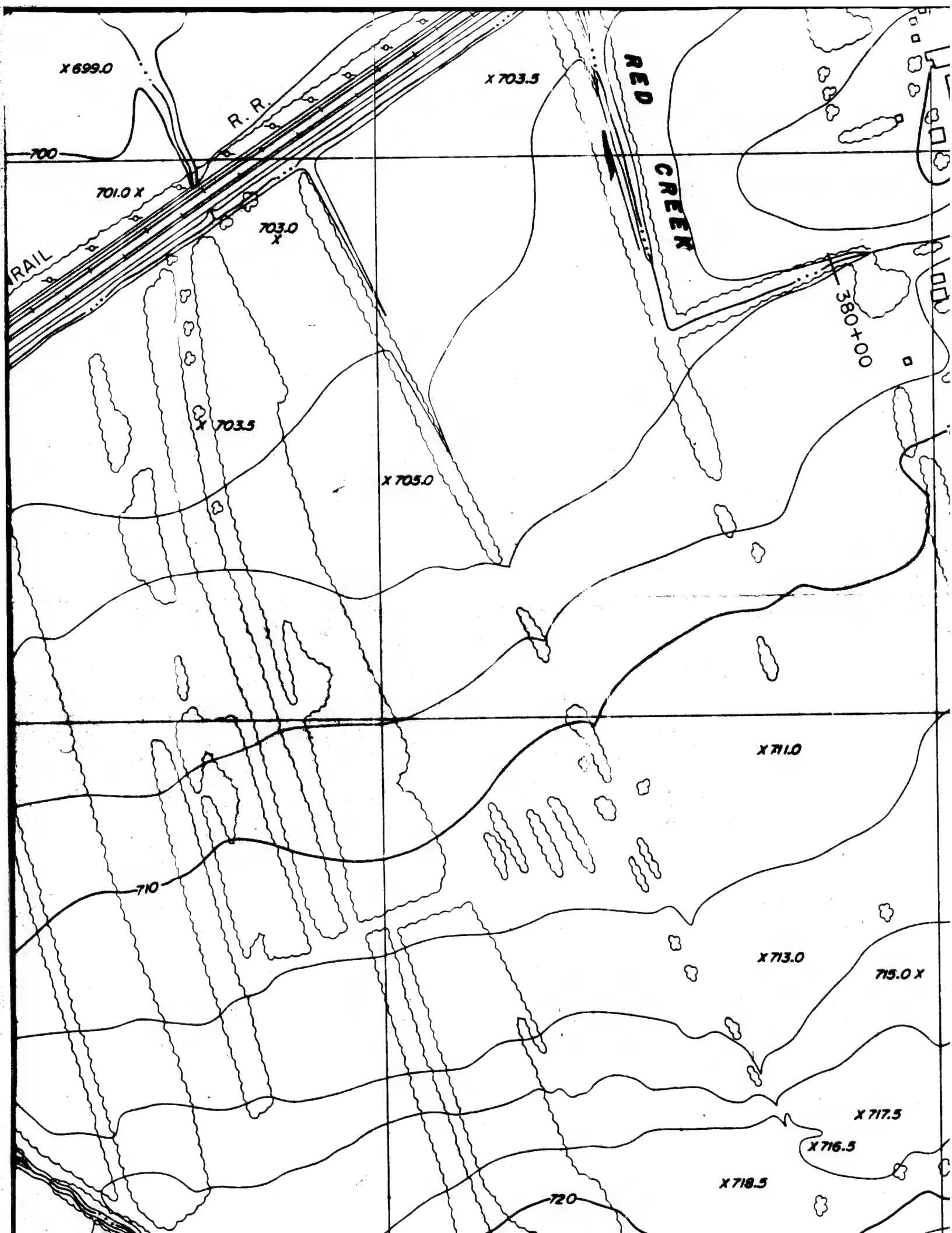

E 2,371,000
E 2,372,000
N.Y.C. R.R.
DEPOT ST.
703.5
702.5X
703.0
X 701.5
X 702.5
X 703.5
700
705.5X
X 702.5
705.5
X 700.5
701.0X
X 700.5
701.5 X
705.0
700
X 701.0
X 709.5
709.5
709.0X
710
710

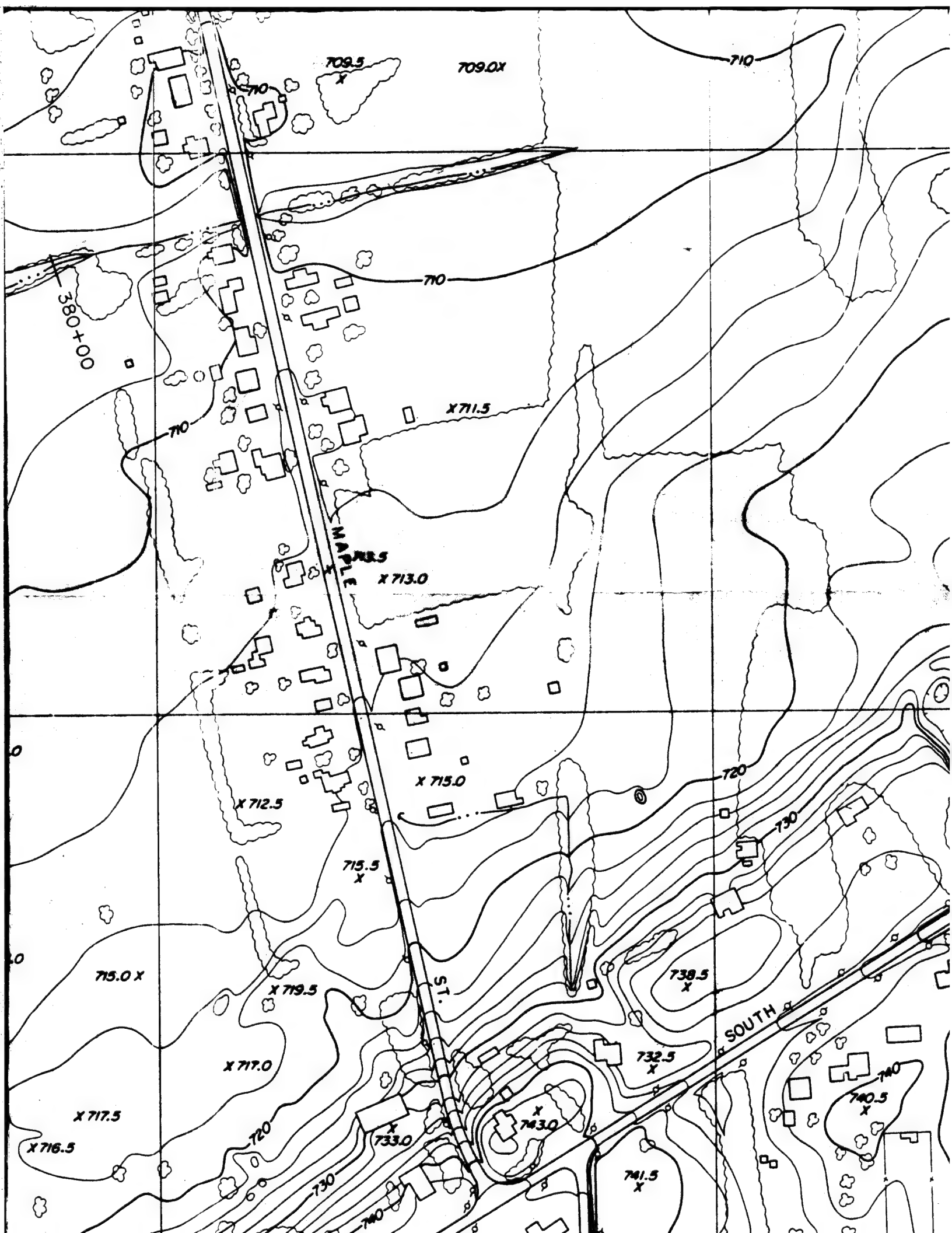

E 2,372,000
E 2,373,000
N.Y.C. R.R.
X 703.5
700
X 700.5
702.5
70+00
705.5 X
X 704.5
X 702.5
X 702.5
704
X 707.5
705
706
707
ZONE X
710
X 711.
708
X 711.0
X 712.5
X 710.5
X 711.0
709
X 710.5
80+00
710
X 709.0
X 708.5
X 709.0
RM 5
X 713.5
X 711.5
MAIN
UPSTREAM STUDY LIMIT
X 708.5
710
710


E2,373,000
E2,374,000
702
704
706
708
700.5
702.5
707.5
ZONE X
710
708.5
711.5
711.0
712.5
710.5
709.0
708.5
80+00
RM5
MAIN
UPSTREAM STUDY LIMIT
720
730

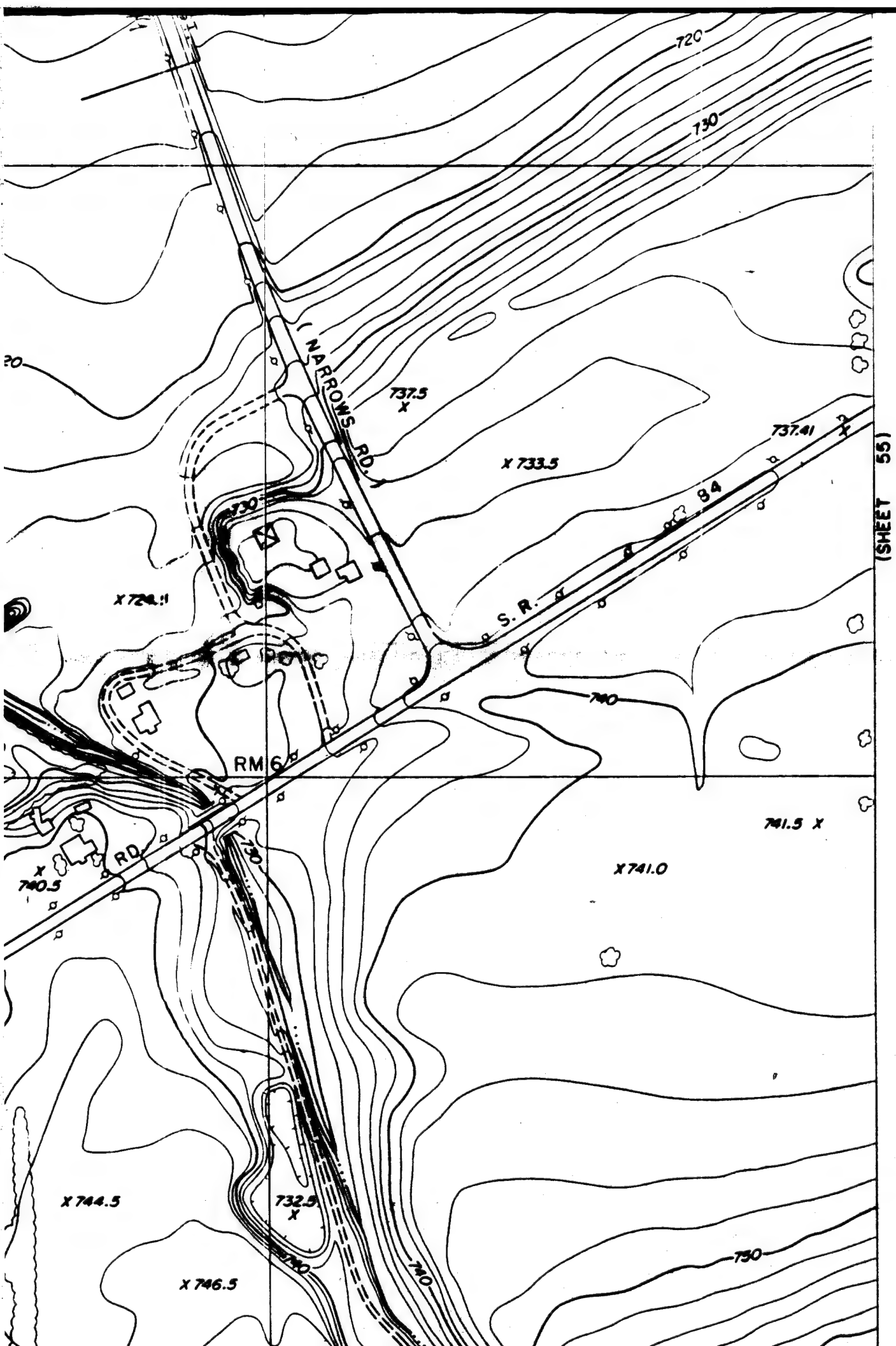

N763,000
N762,000
(SHEET 82)
X 699.5
698.5
X 698.5
700
703.5
701.0
X 698.5
700.5
706.5
697.5 X
X697.5
X 702.5
X 701.0
707.0 X
X 701.0
X 705.5
X 705.0
703.0
708.3
709.5
705.5
707.5
708.0
X 707.5
706.5
710

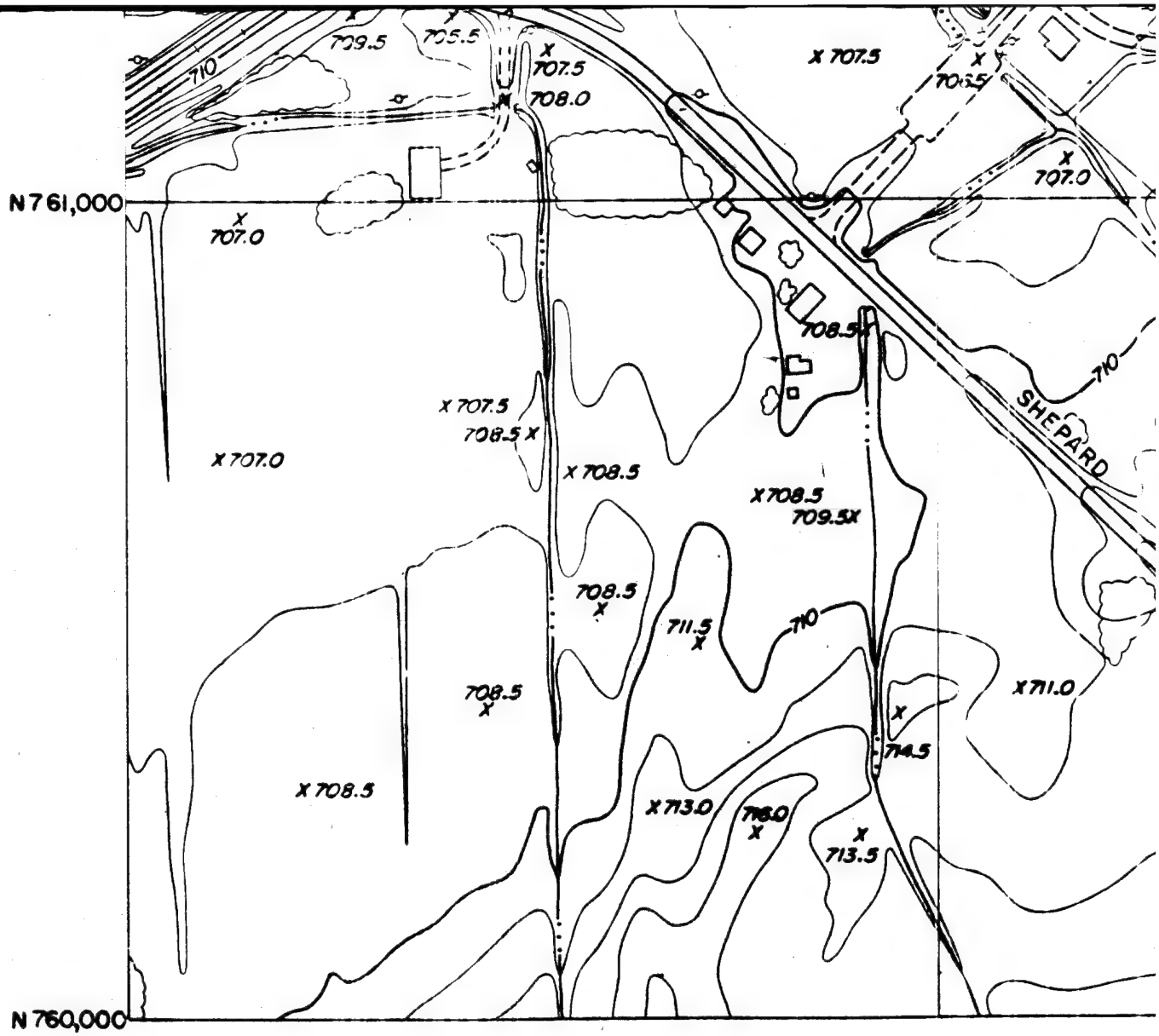

698.5 X
X 699.0
700
X 701.0
X 698.5
X 699.0
701.0 X
CONRAIL
X 700.5
X 698.5
706.5
700
X 703.0
705.5 X
700
707.0 X
X 707.0
X 708.5
710
X 705.5
X 707.0
X 708.0
711.5 X
708.5 X
710
706.5
07.5
706.5


X 699.0
R. R.
700
701.0 X
703.0
X
RAIL
X 703.5
RED CREEK
380+00
X 703.5
X 705.0
X 711.0
710
X 713.0
715.0 X
X 717.5
X 716.5
X 718.5
720


709.5
709.0
710
710
710
380+00
710
711.5
MAPLE
713.5
713.0
715.0
712.5
715.5
720
730
715.0
719.5
ST.
738.5
SOUTH
717.0
732.5
717.5
716.5
720
733.0
743.0
740
740.5
730
741.5
740


710
720
730
740
NARROWS RD.
737.5
X 733.5
X 724.1
S.R.
RM 6
RD.
X 740.5
RIDGE
738.5
SOUTH
732.5
740.5
X 744.5
732.5
741.5
X 746.5


720
730
NARROWS RD.
737.5
X 733.5
737.41
730
84
S. R.
X 741.1
740
RM 6
741.5 X
X 741.0
RD.
730
740.5
X 744.5
732.5
730
740
X 746.5
730
(SHEET 55)



OHIO COORDINATE SYSTEM
LAMBERT GRID

ELEVATIONS ARE BASED ON
MEAN SEA LEVEL 1927
NORTH AMERICAN DATUM

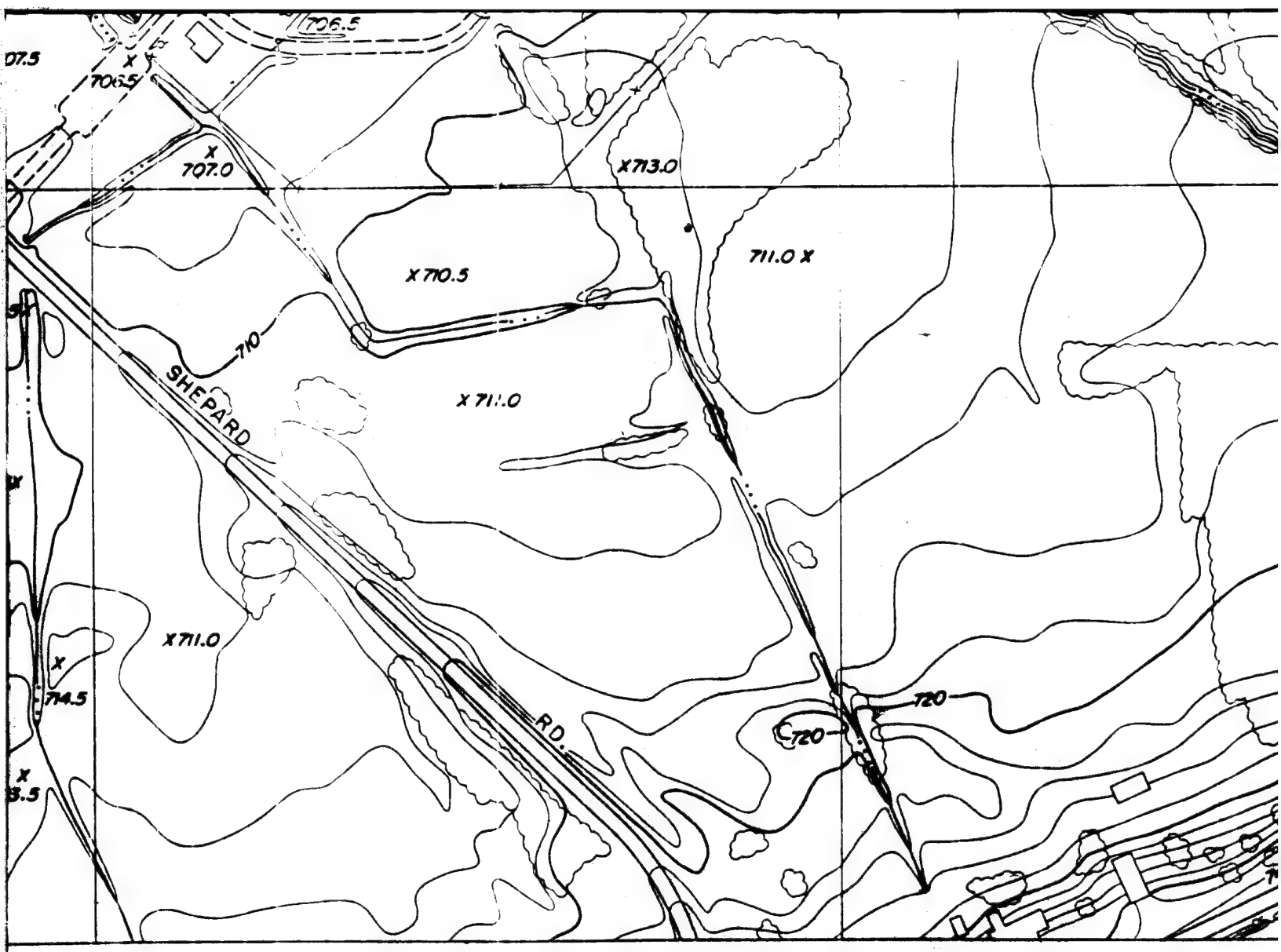
PREPARED BY:
KUCERA & ASSOCIATES INC.
PHOTOGRAMMETRIC ENGINEERS
MENTOR, OHIO

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS

A

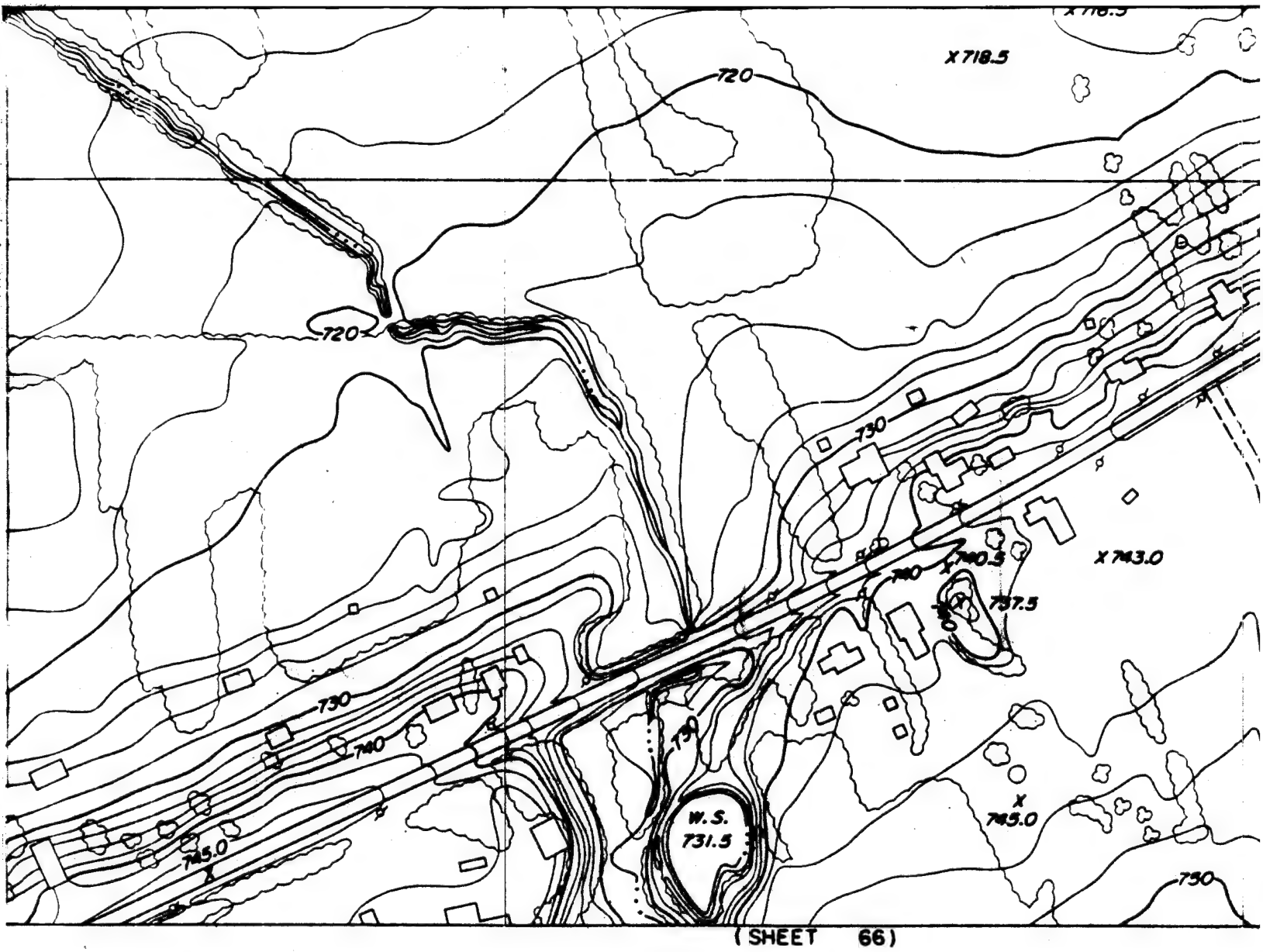
RM1

650



LEGEND

- 100 YEAR FLOOD LIMITS
- 500 YEAR FLOOD LIMITS
- FLOODWAY LIMITS
- A — A CROSS SECTION LOCATION
- RM1 X ELEVATION REFERENCE MARK
- HYDRAULIC BASELINE
- 650 BASE FLOOD ELEVATION



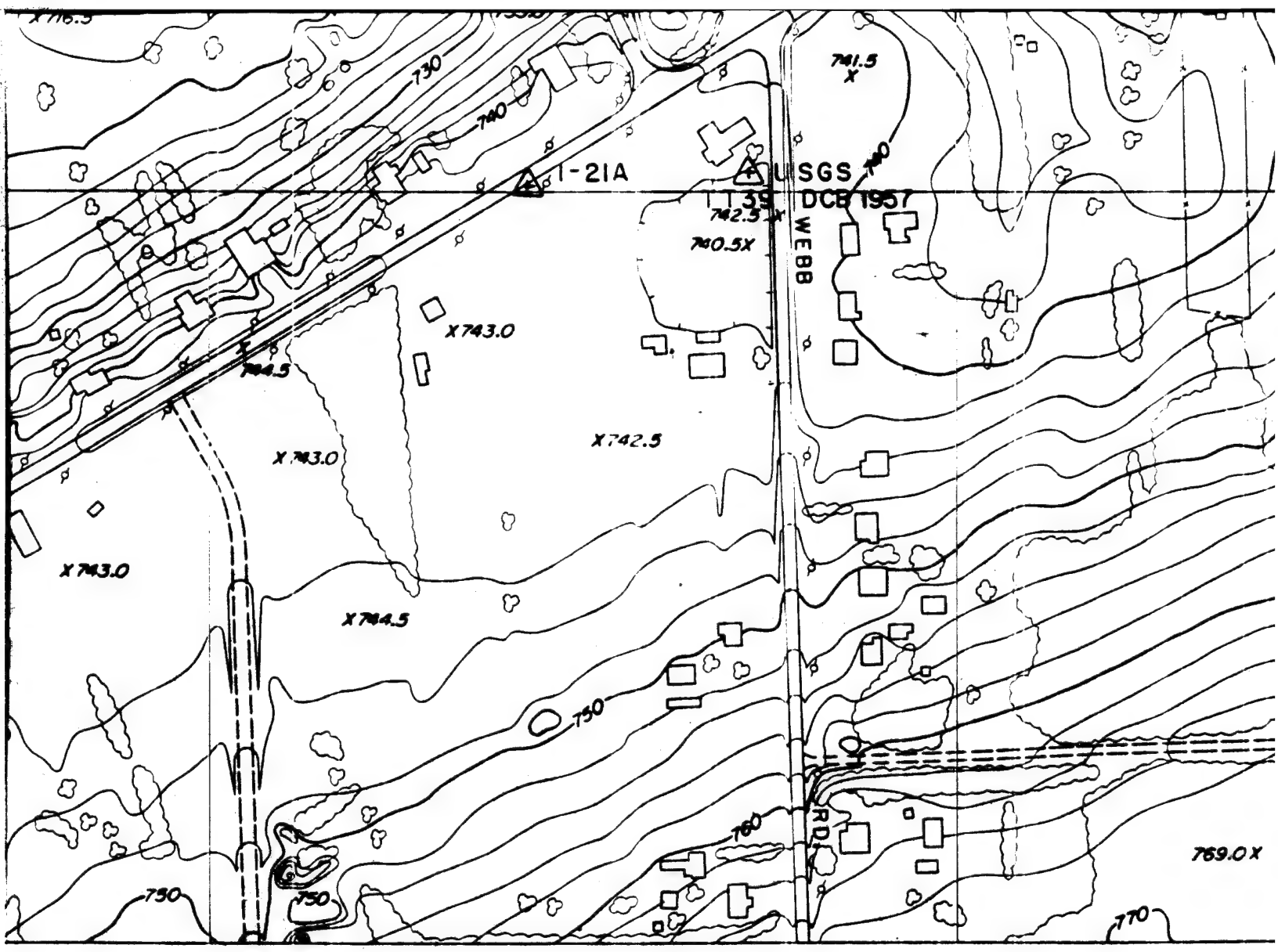
(SHEET 66)

200 100 0 200 400 600 FEET

SCALE: 1" = 200' CONTOUR INTERVAL: 2'

DATE OF PHOTOGRAPHY

NOVEMBER, 1966 - JANUARY 1967



600 FEET

INTERVAL: 2

1967

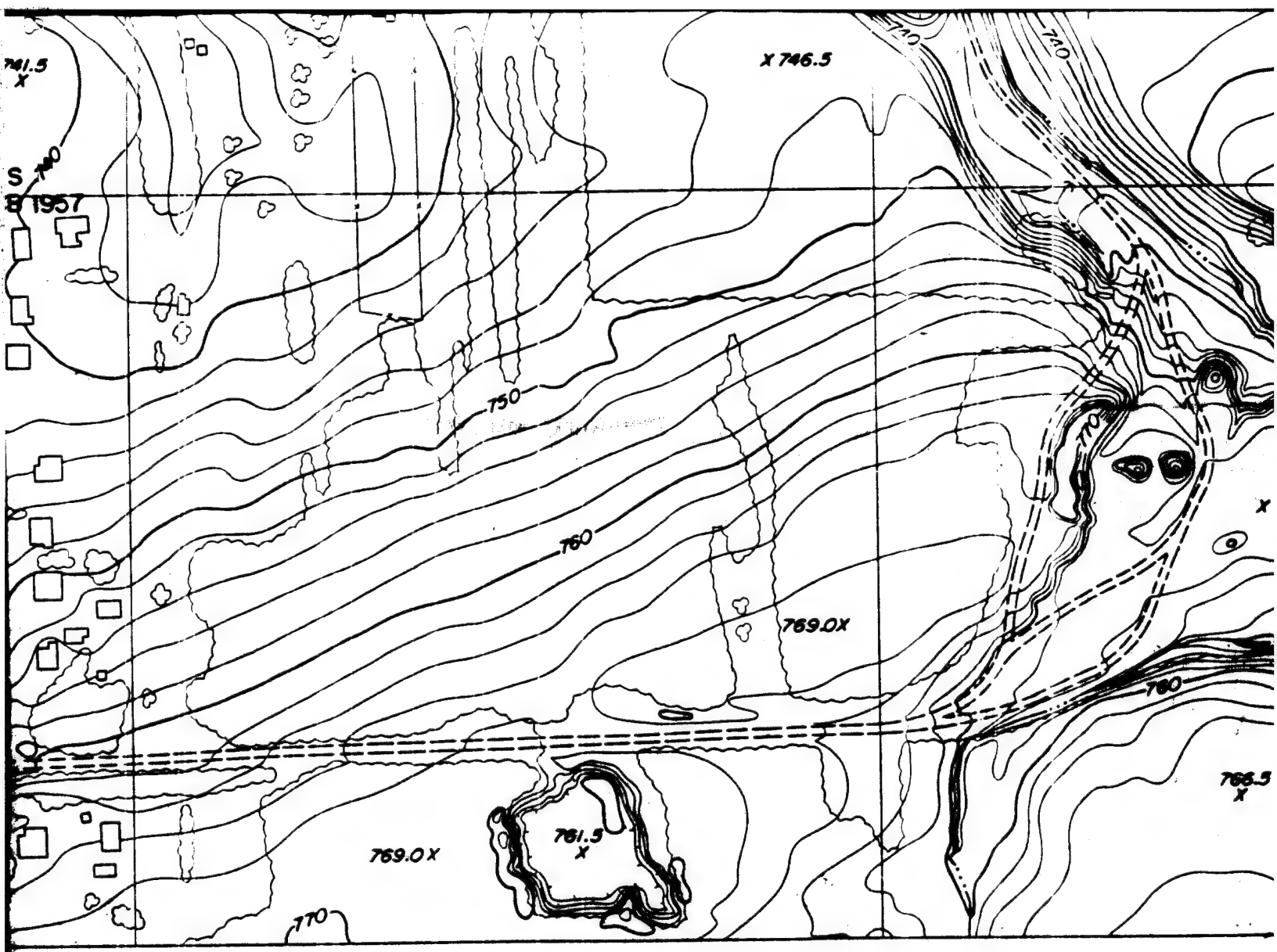
N

88

RED CREEK - R

FLOODE

VILLAGE C



N

	83	64	56
88	82	65	55

LAKE COUN

TOPOGRAPH

PREPARED F

BOARD OF LAKE COUN

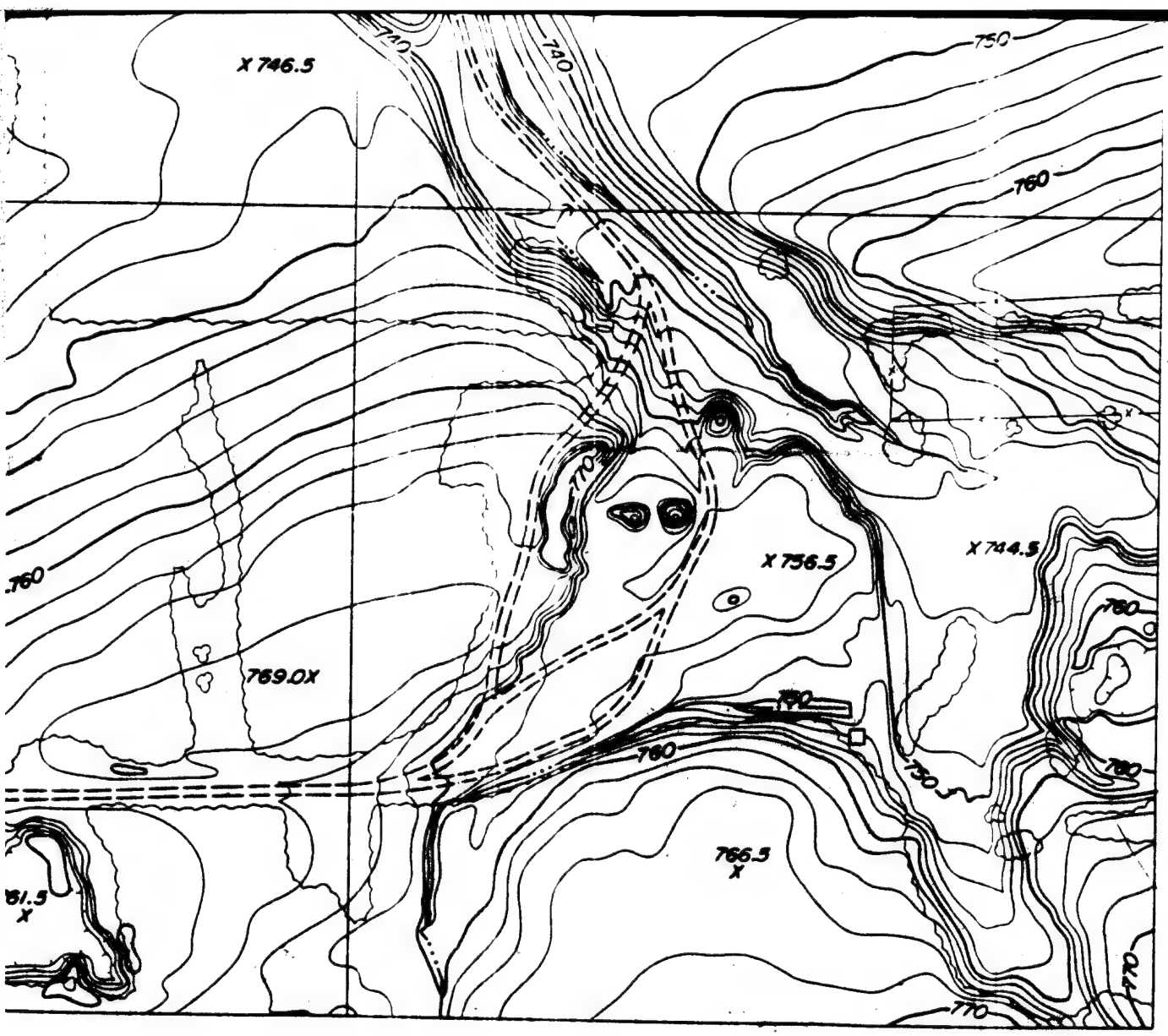
ROBERT B. FULTON,

JOHN D. HADDEN – HOM

RED CREEK - RED MILL CREEK

FLOODED AREA MAP

VILLAGE OF PERRY, OHIO



LAKE COUNTY, OHIO

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSIONERS

ROBERT B. FULTON, CHAIRMAN

JOHN D. HADDEN – HOWARD B. BEEBE

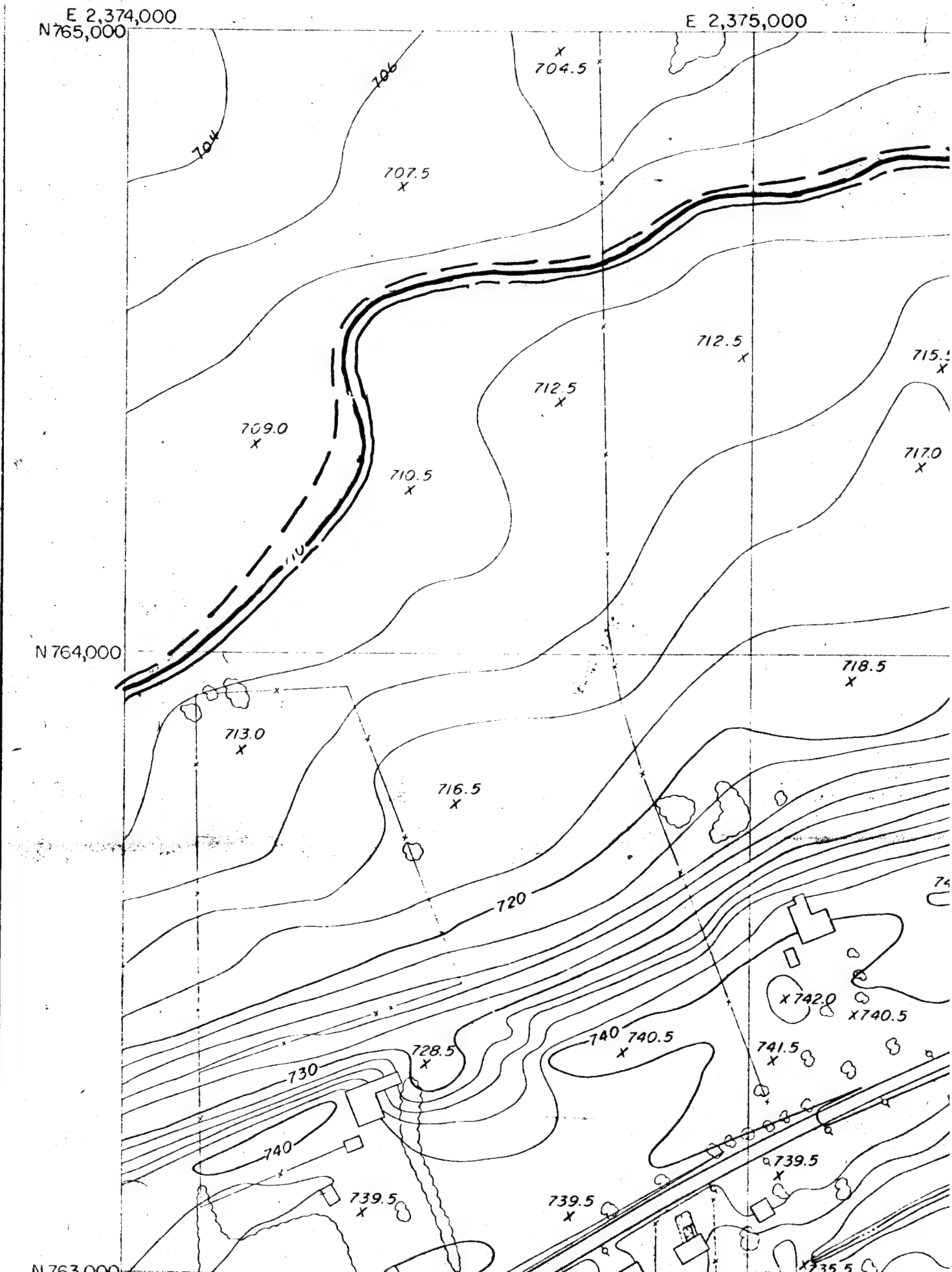
56

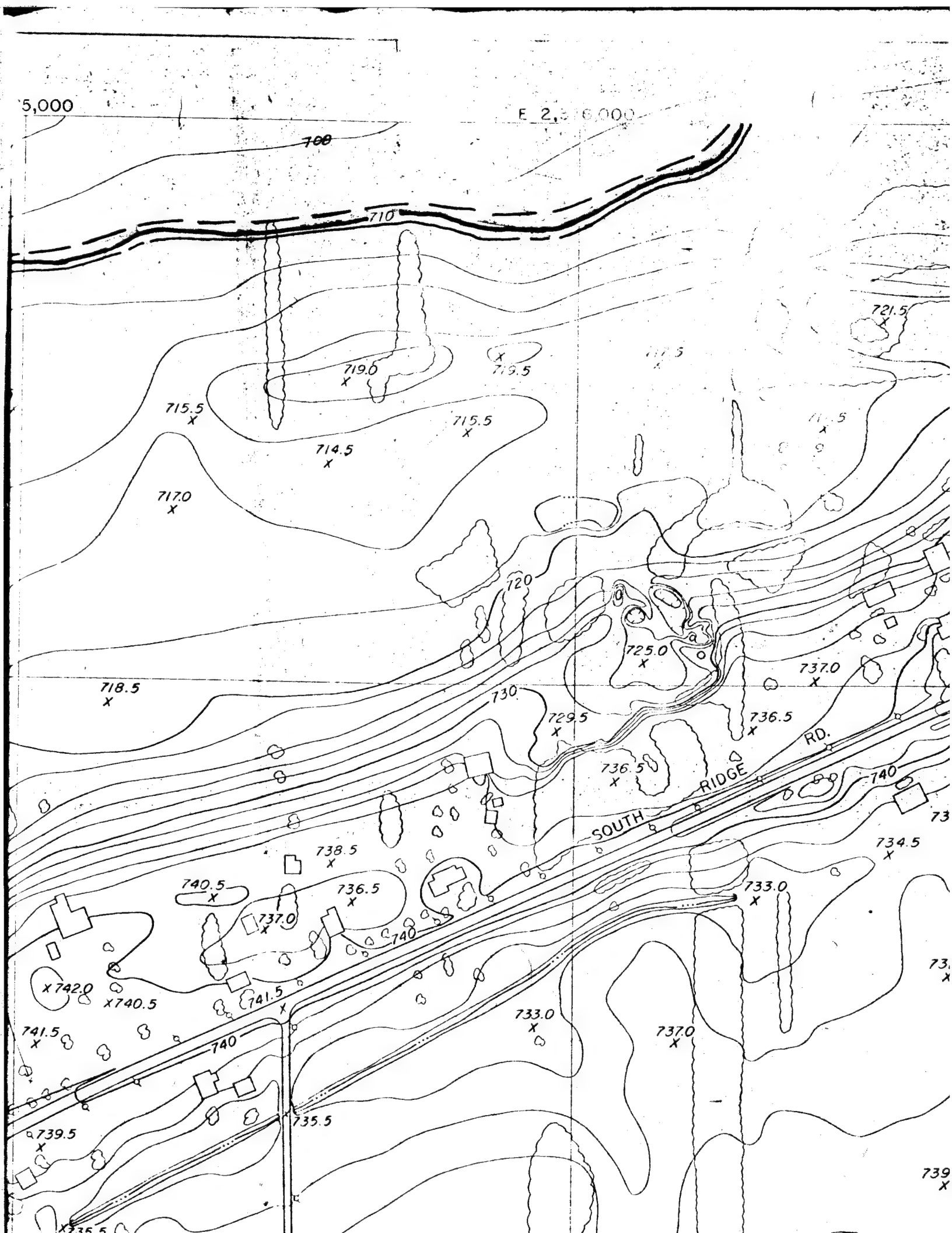
55

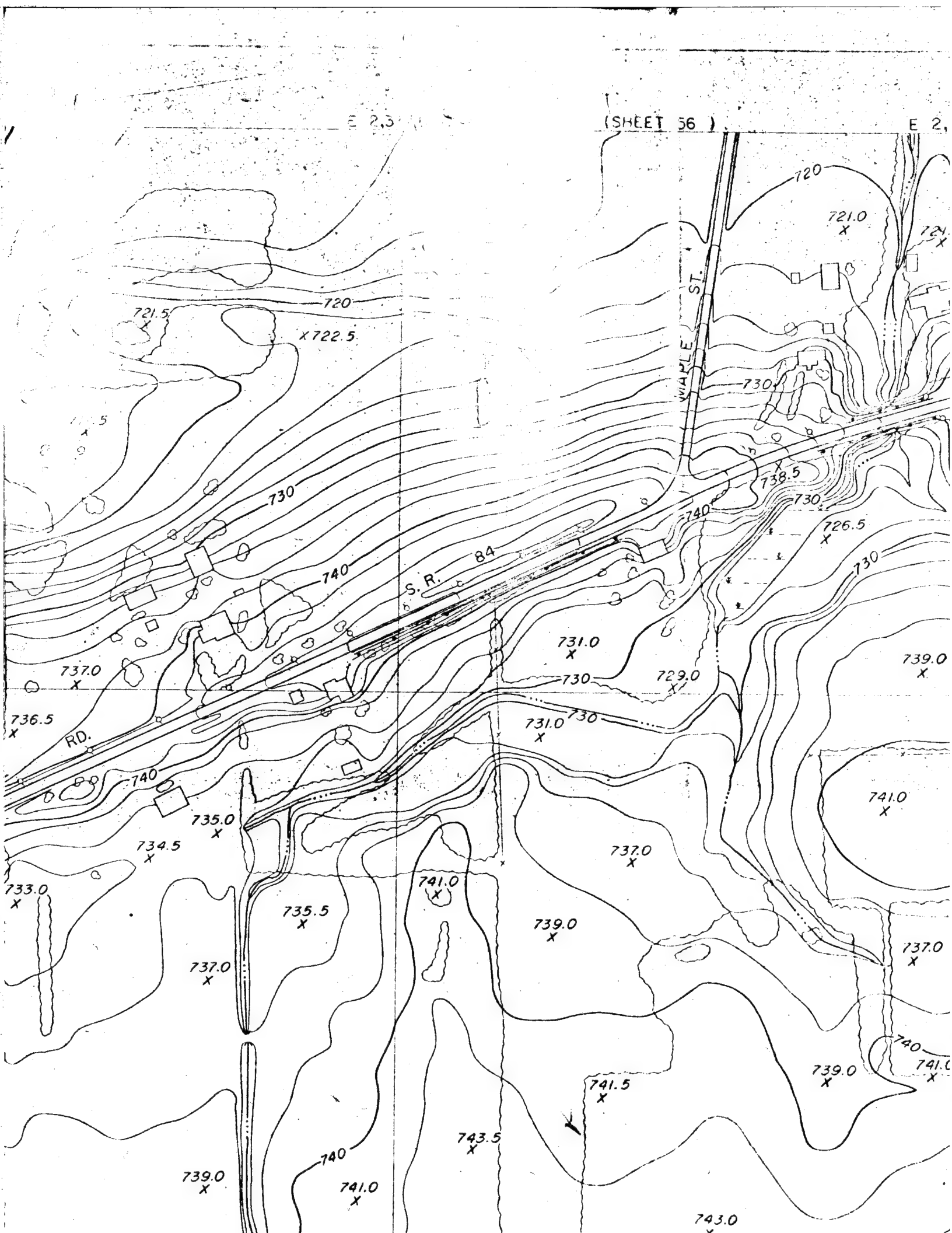
ILL CREEK

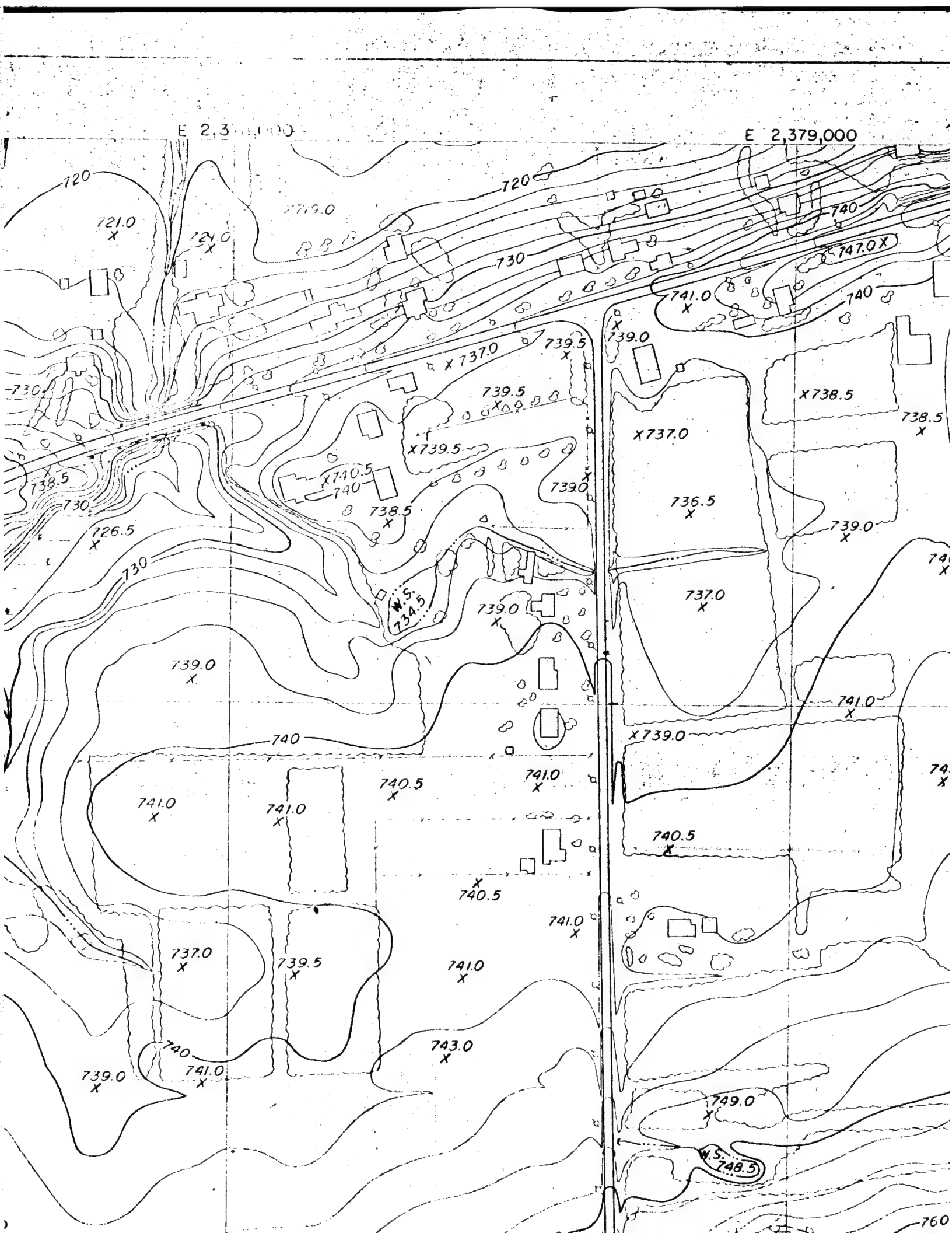
MAP

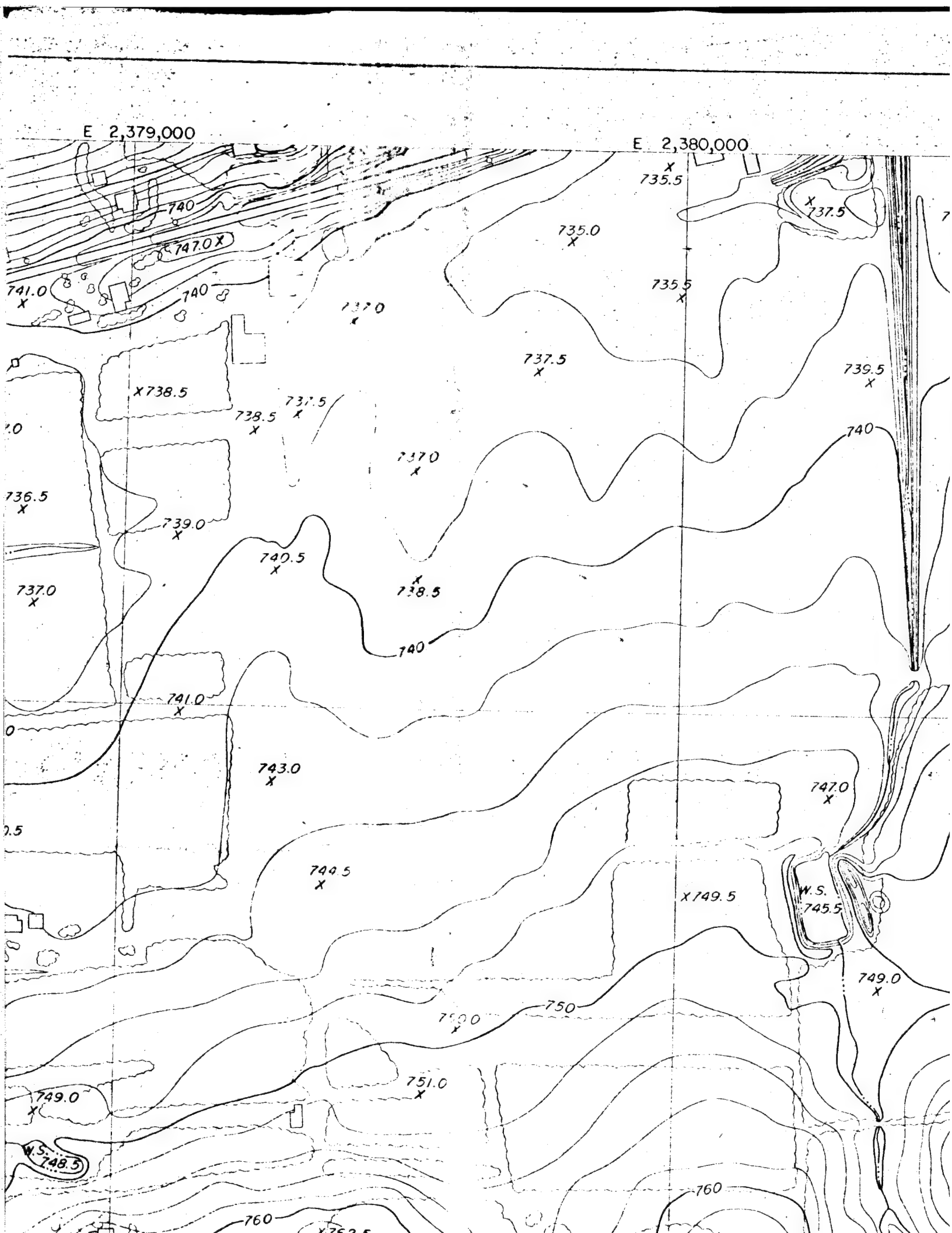
RRY, OHIO

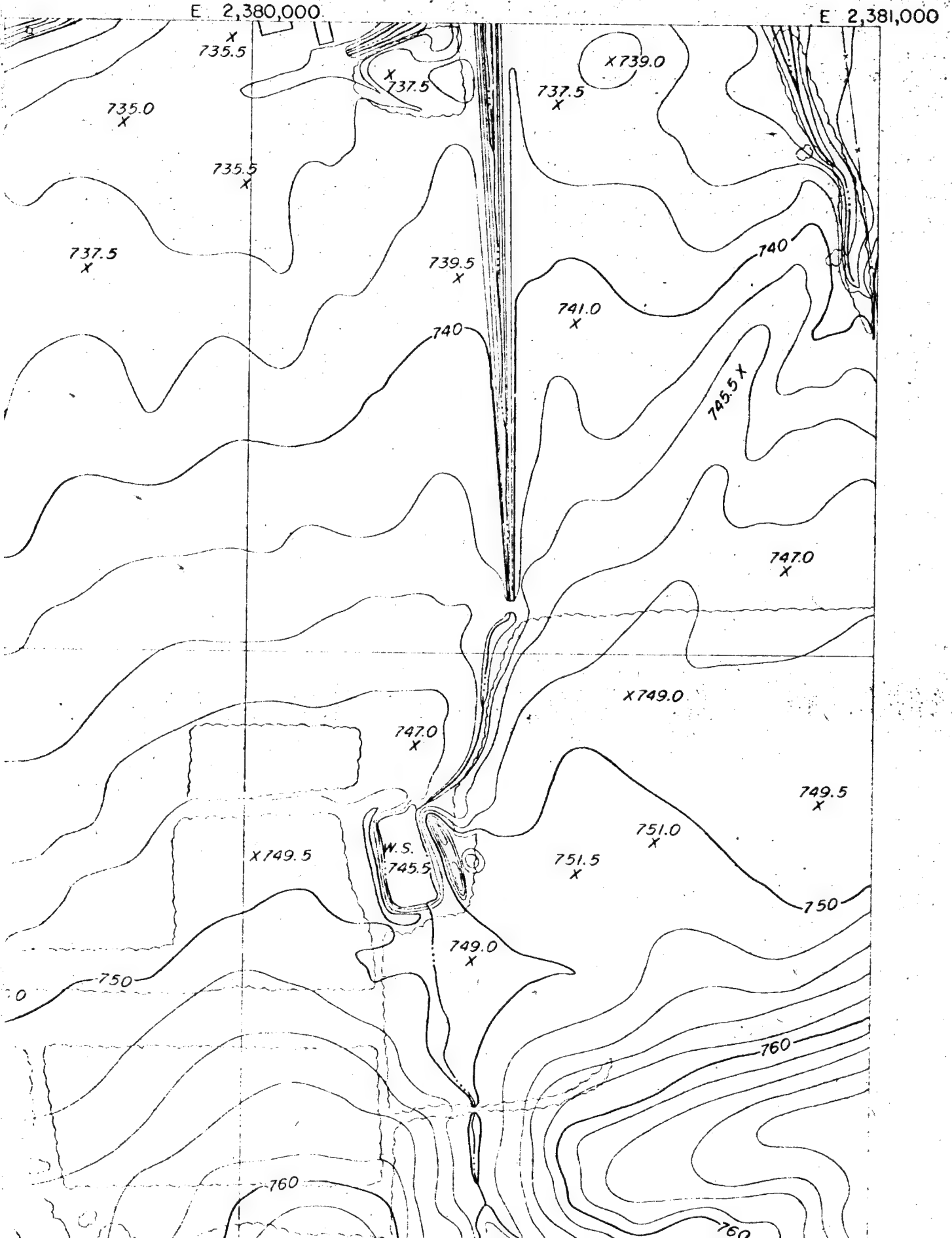

E 2,374,000
N765,000
E 2,375,000
704.5
706
704
707.5
712.5
712.5
715.5
709.0
710.5
717.0
N 764,000
718.5
713.0
716.5
720
742.0
740.5
740
740.5
741.5
728.5
730
740
739.5
739.5
739.5
N 763,000

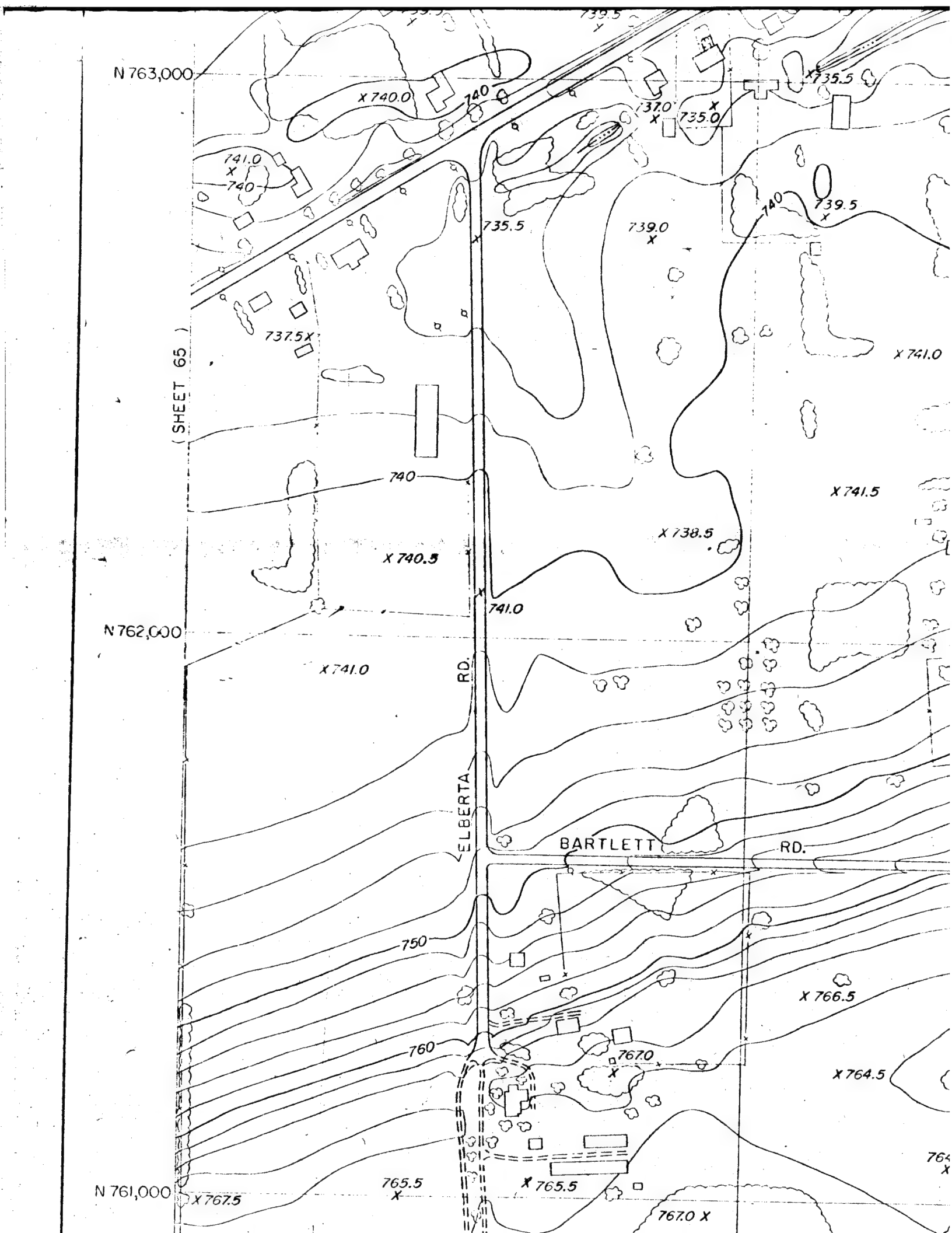

5,000
E 2,
700
710
721.5
719.6
719.5
715.5
715.5
714.5
717.0
720
725.0
737.0
718.5
730
729.5
736.5
RD.
736.5
RIDGE
740
SOUTH
738.5
734.5
740.5
736.5
733.0
737.0
740
742.0
740.5
741.5
733.0
737.0
741.5
740
735.5
739.5

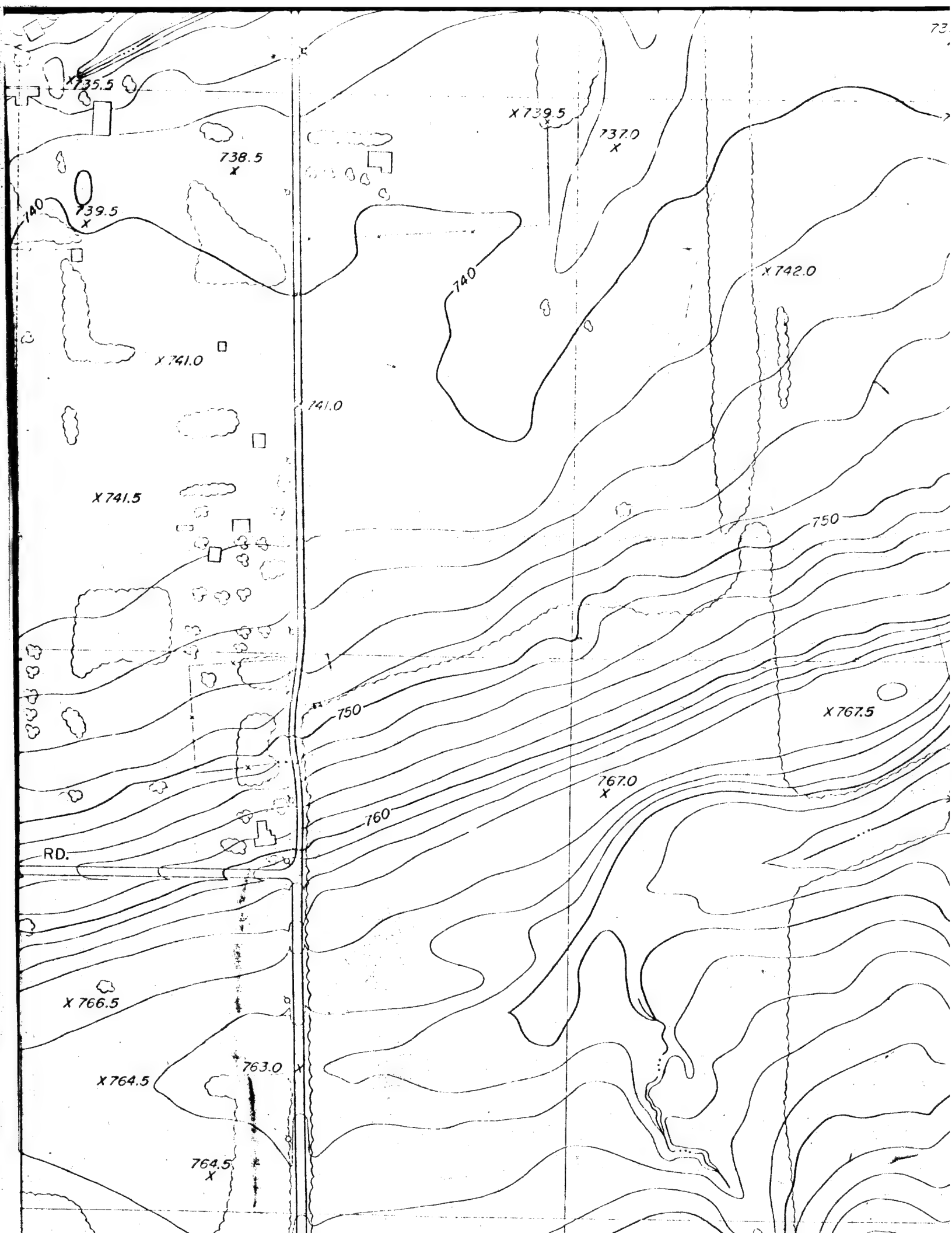

(SHEET 56)
E 2,3
E 2,
720
721.0
721.5
722.5
730
MAPLE ST.
738.5
740
726.5
S.R. 84
731.0
737.0
729.0
739.0
736.5
RD.
735.0
734.5
733.0
735.5
741.0
737.0
741.5
743.5
739.0
743.0

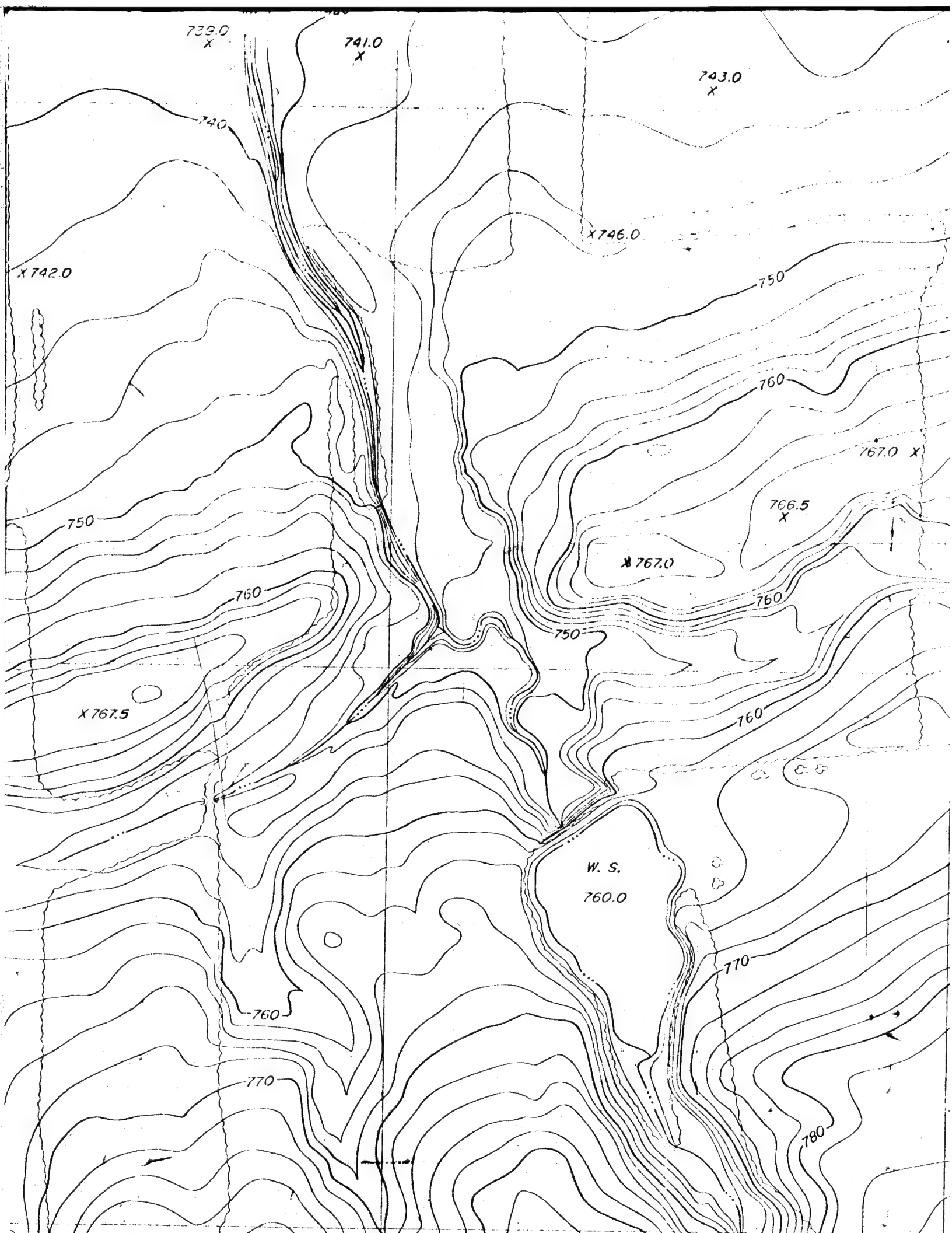

E 2,379,000
720
721.0
730
738.5
726.5
740
741.0
739.5
737.0
740.5
736.5
747.0
749.0
W.S. 734.5
W.S. 748.5
743.0
760

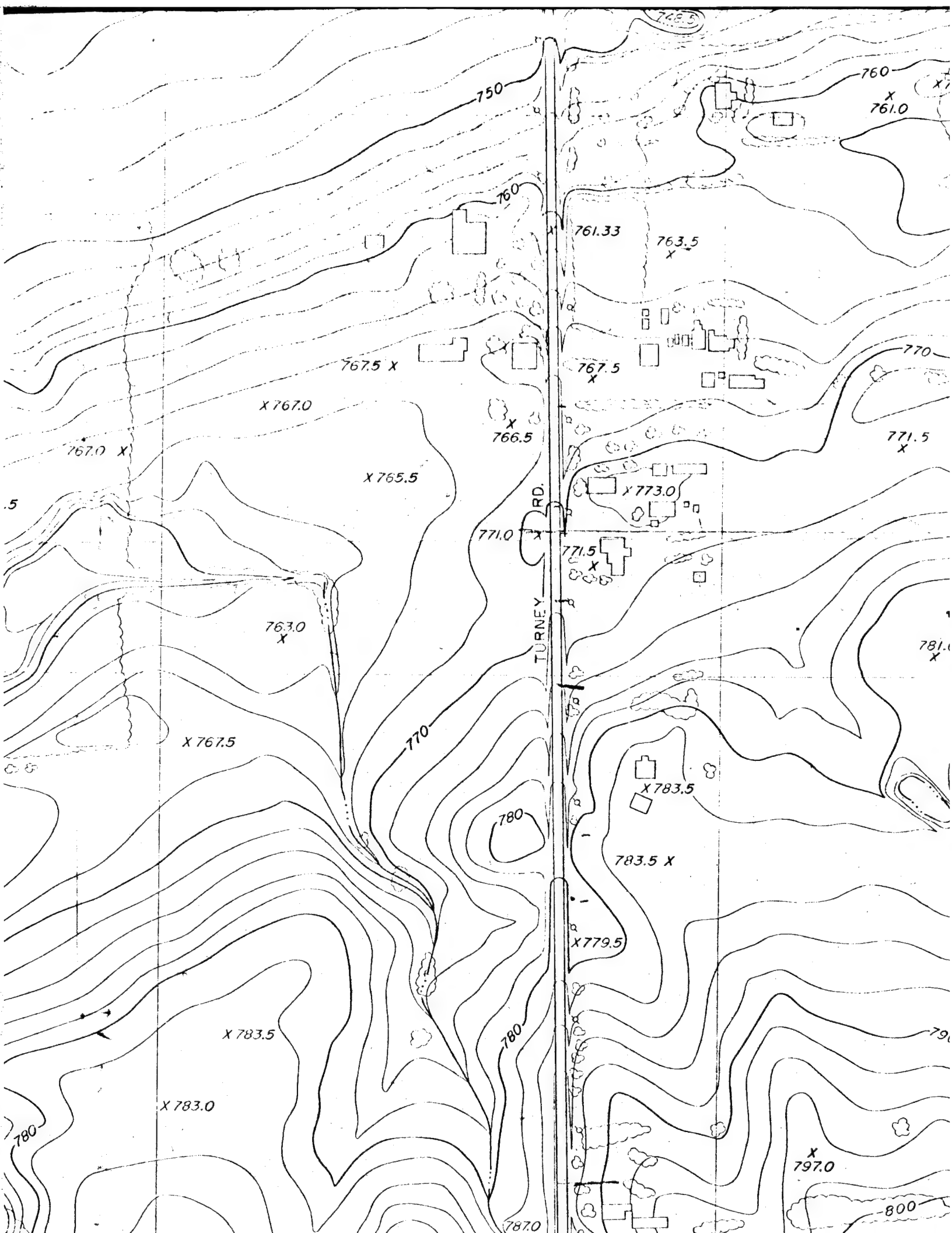

E 2,379,000
E 2,380,000
740
747.0
741.0
740
735.5
737.5
735.0
735.5
737.5
739.5
738.5
738.5
740
736.5
739.0
740.5
737.0
738.5
740
741.0
743.0
747.0
744.5
749.5
W.S.
745.5
749.0
750
751.0
749.0
W.S.
748.5
760
760

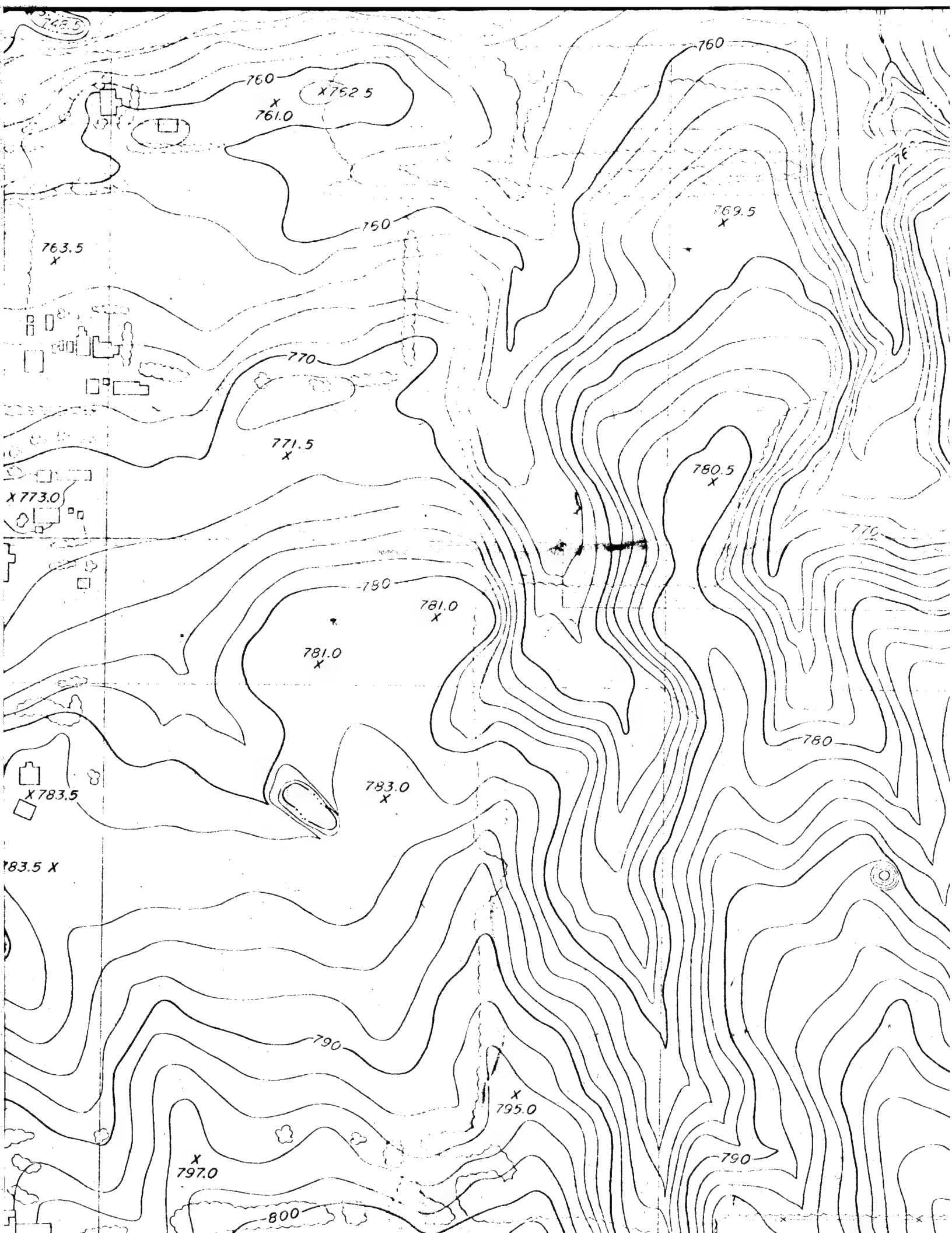

E 2,380,000
E 2,381,000
735.5
737.5
735.0
735.5
737.5
739.0
737.5
739.5
740
741.0
740
745.5
747.0
749.0
747.0
749.5
751.0
749.5
W.S.
745.5
751.5
750
750
749.0
760
760
760

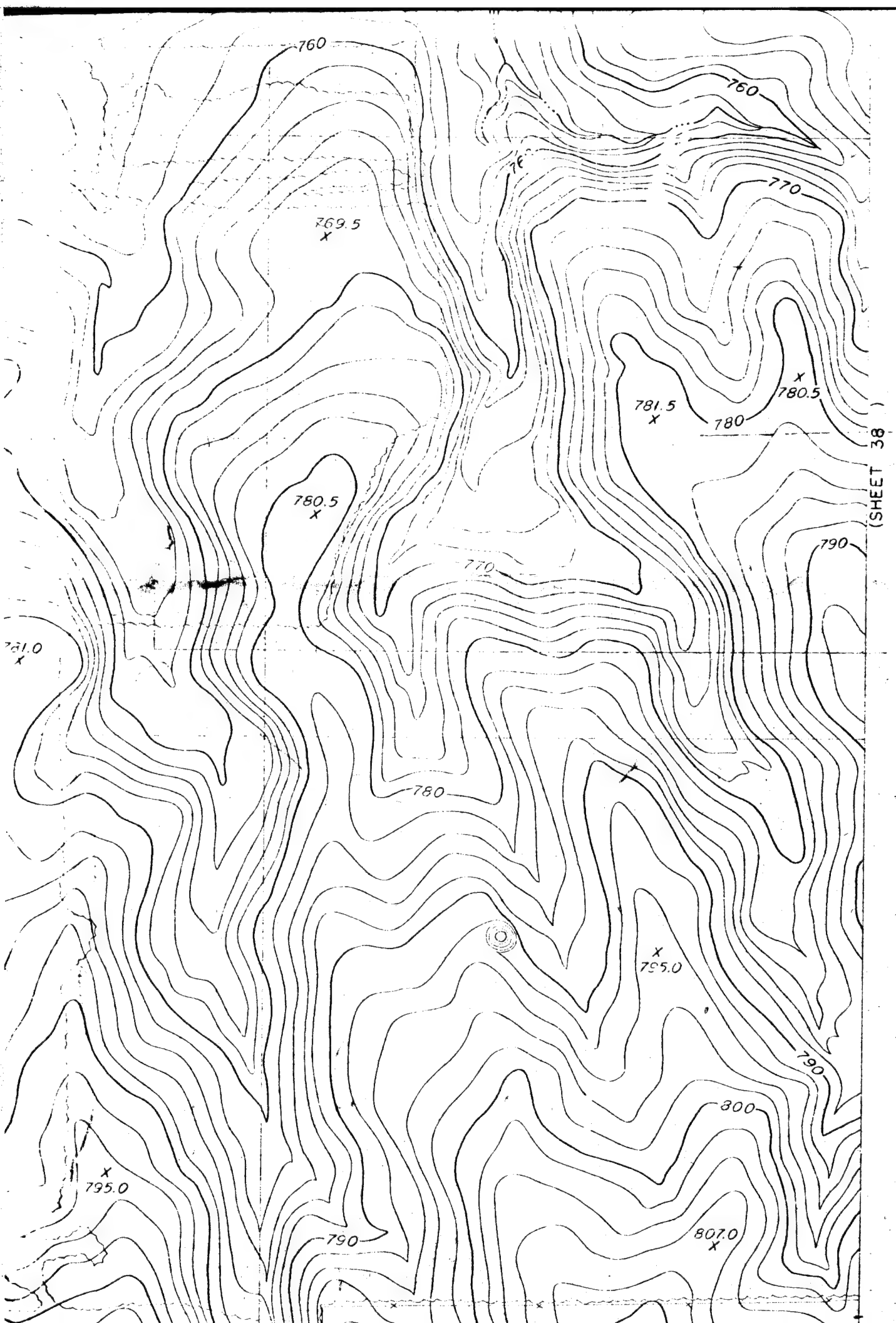

N 763,000
N 762,000
N 761,000
740.0
740
737.0
735.0
735.5
741.0
740
739.5
735.5
739.0
737.5
741.0
740
741.5
738.5
740.5
741.0
741.0
RD.
ELBERTA
BARTLETT
RD.
750
766.5
760
767.0
764.5
765.5
765.5
767.5
767.0
(SHEET 65)

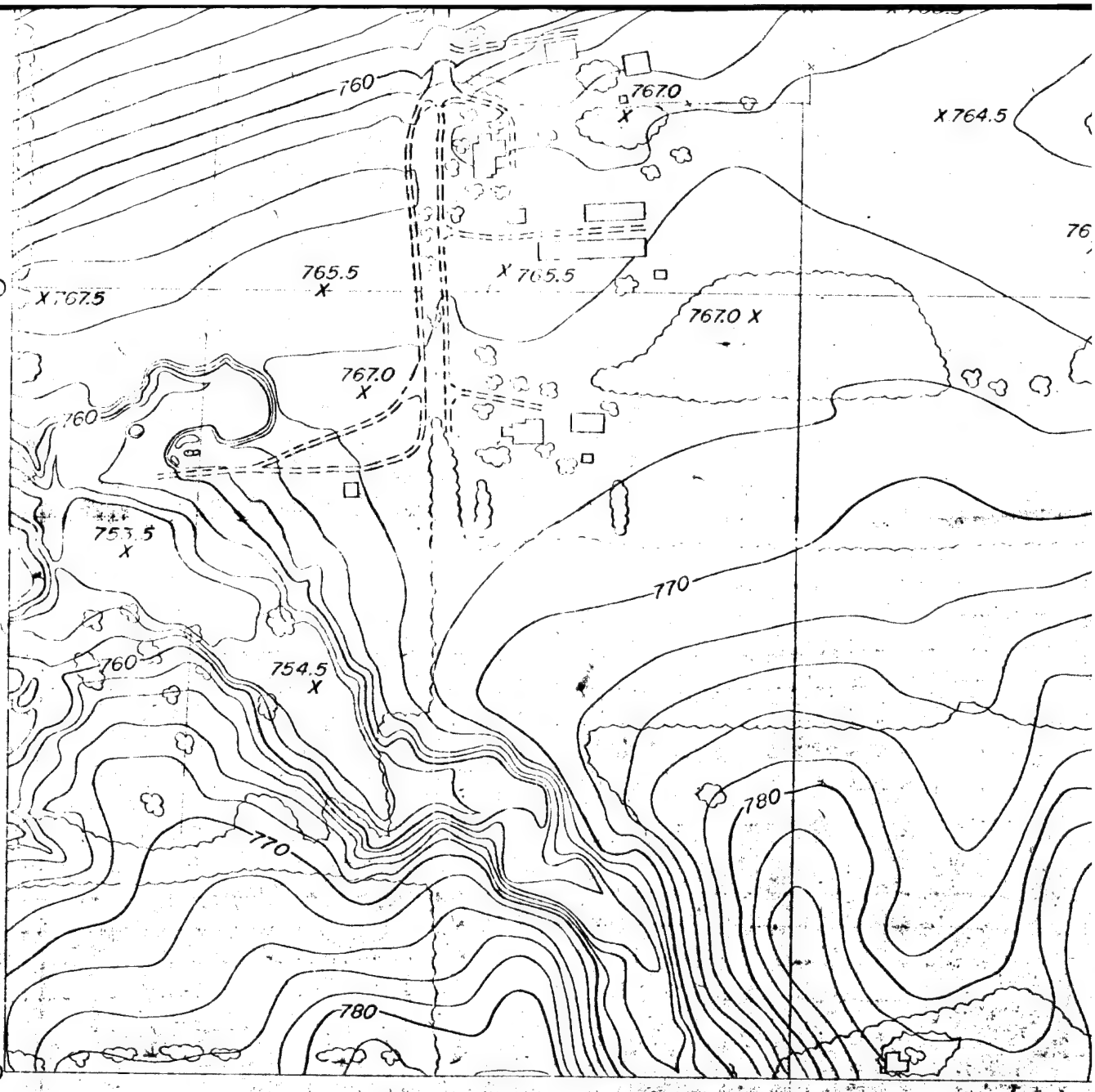

735.5
739.5
738.5
740
739.5
740
742.0
741.0
741.0
741.5
750
750
767.5
767.0
760
RD.
766.5
763.0
764.5
764.5


739.0
741.0
743.0
740
746.0
742.0
750
760
767.0
766.5
767.0
750
760
750
760
767.5
W. S.
760.0
770
760
770
780


750
760
761.0
760
761.33
763.5
767.5 X
767.5
770
X 767.0
766.5
771.5
767.0 X
X 765.5
X 773.0
RD.
771.0
771.5
TURNEY
763.0
781.
770
X 767.5
X 783.5
780
783.5 X
X 779.5
X 783.5
780
X 783.0
780
797.0
800
787.0


760
760
X 762.5
X 761.0
750
763.5
X
769.5
X
770
771.5
X
X 773.0
780.5
X
770
780
781.0
X
781.0
X
780
X 783.5
783.0
X
783.5 X
790
X 795.0
X 797.0
790
800


760
760
770
769.5
781.5
780.5
780
780.5
790
770
781.0
780
795.0
790
800
795.0
790
807.0
(SHEET 38



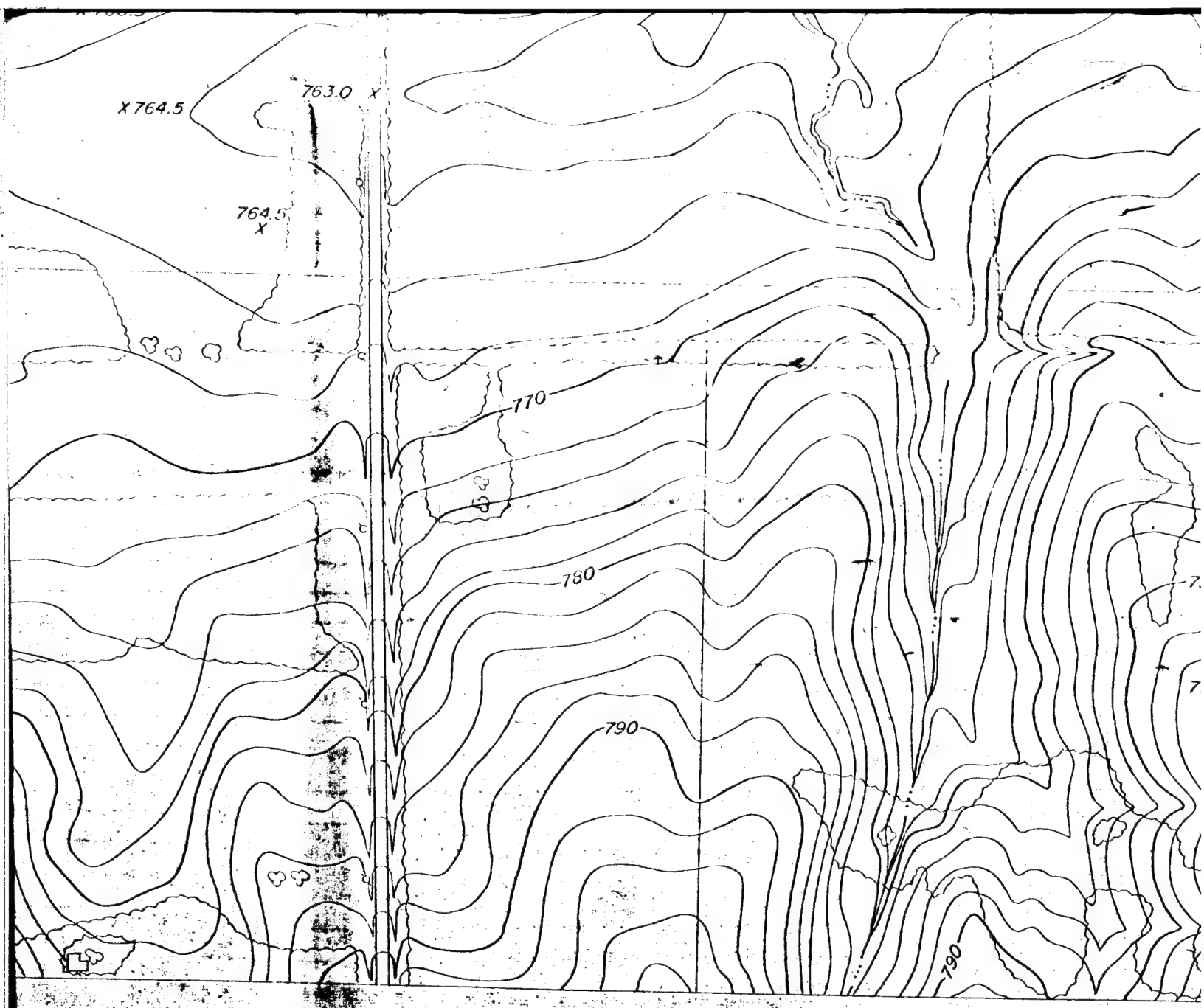
OHIO COORDINATE SYSTEM
LAMBERT GRID

ELEVATIONS ARE BASED ON
MEAN SEA LEVEL 1927
NORTH AMERICAN DATUM

PREPARED BY:
KUCERA & ASSOCIATES INC.
PHOTOGRAMMETRIC ENGINEERS
MENTOR, OHIO

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS

LEG
10
5C
EL
A
A
C
RM1 X
E
H
B



LEGEND

100 YEAR FLOOD LIMITS

500 YEAR FLOOD LIMITS

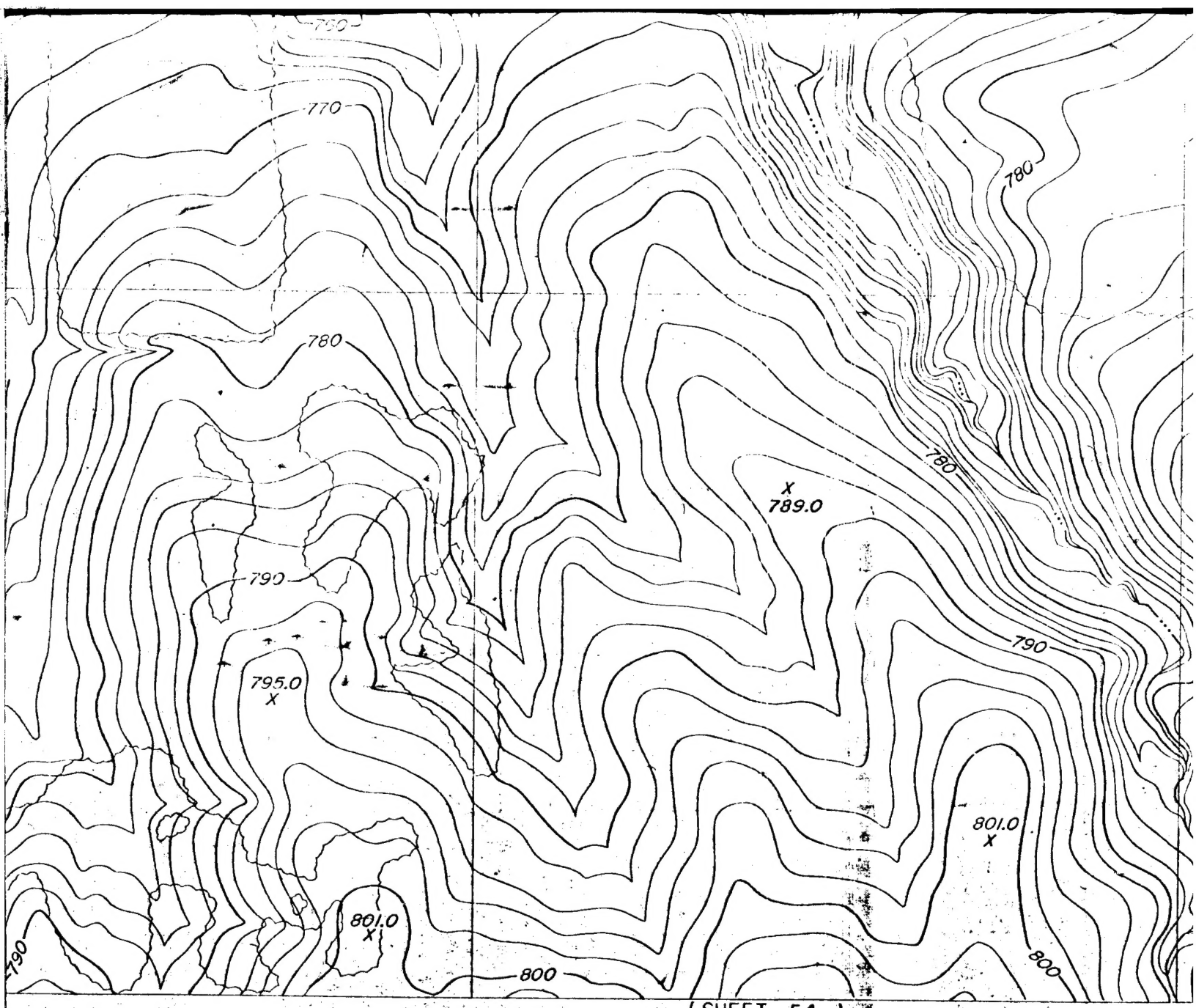
FLOODWAY LIMITS

A — A CROSS SECTION LOCATION

RM1 X ELEVATION REFERENCE MARK

HYDRAULIC BASELINE

BASE FLOOD ELEVATION

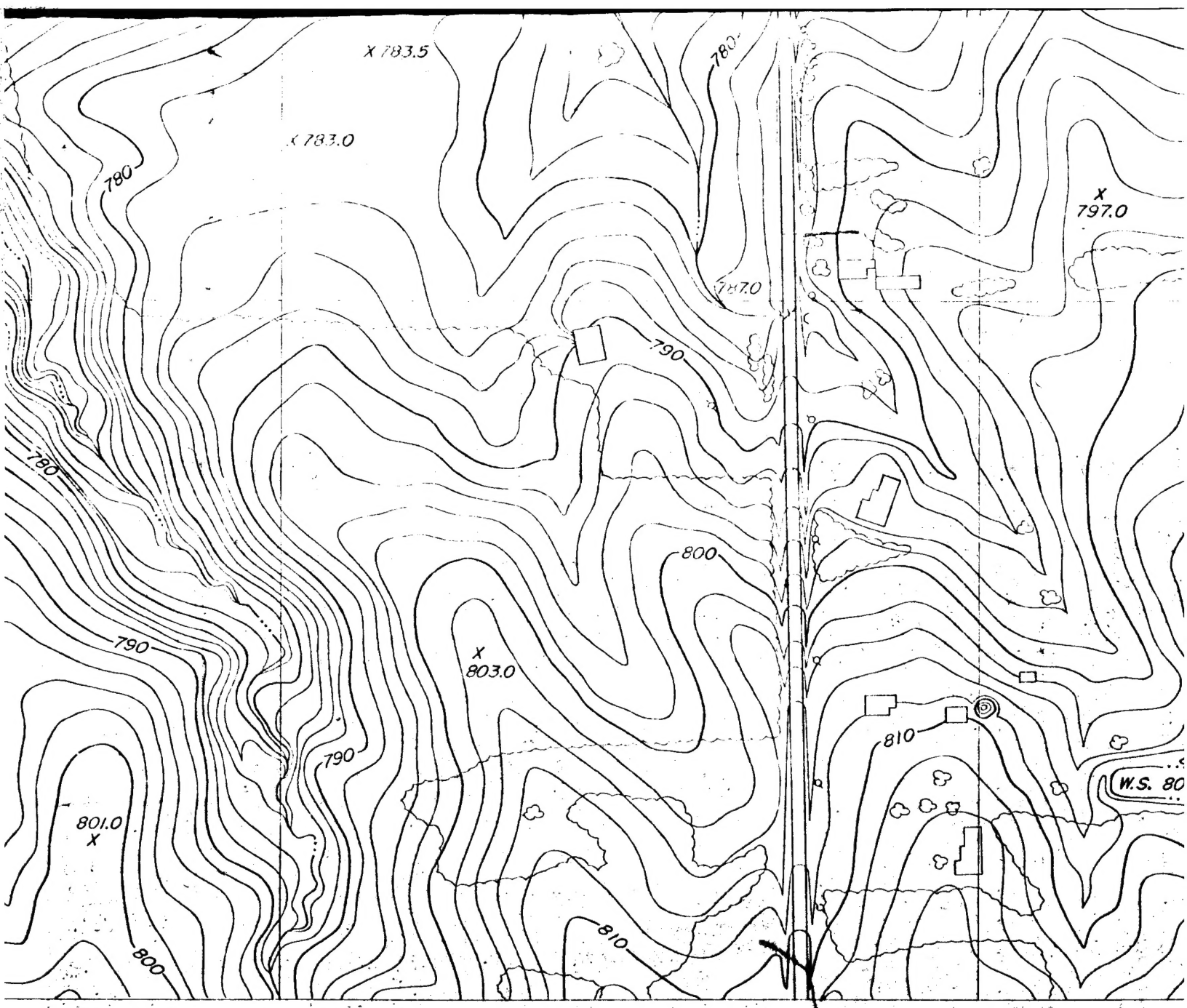


(SHEET 54)

200 100 0 200 400 600 FEET

SCALE: 1"= 200' CONTOUR INTERVAL: 2'

DATE OF PHOTOGRAPHY
NOVEMBER, 1966 – JANUARY 1967



400 600 FEET

ITOUR INTERVAL: 2'

APHY

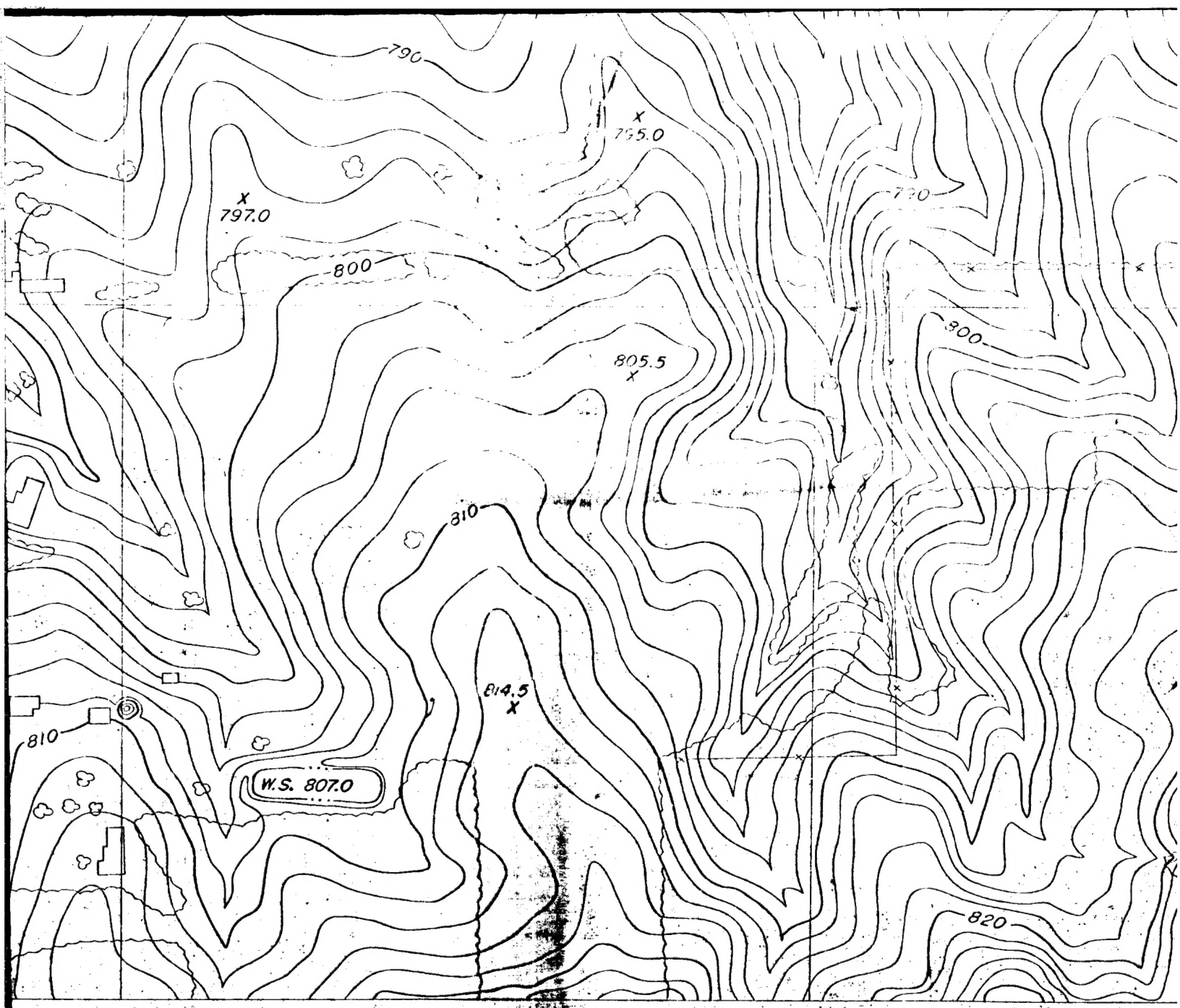
ANUARY 1967

N

RED CREEK-

FLOO

VILLAGE



N

83 64

88 82 65

LAKE COUN

TOPOGRAPH

PREPARED FO

BOARD OF LAKE COUNT

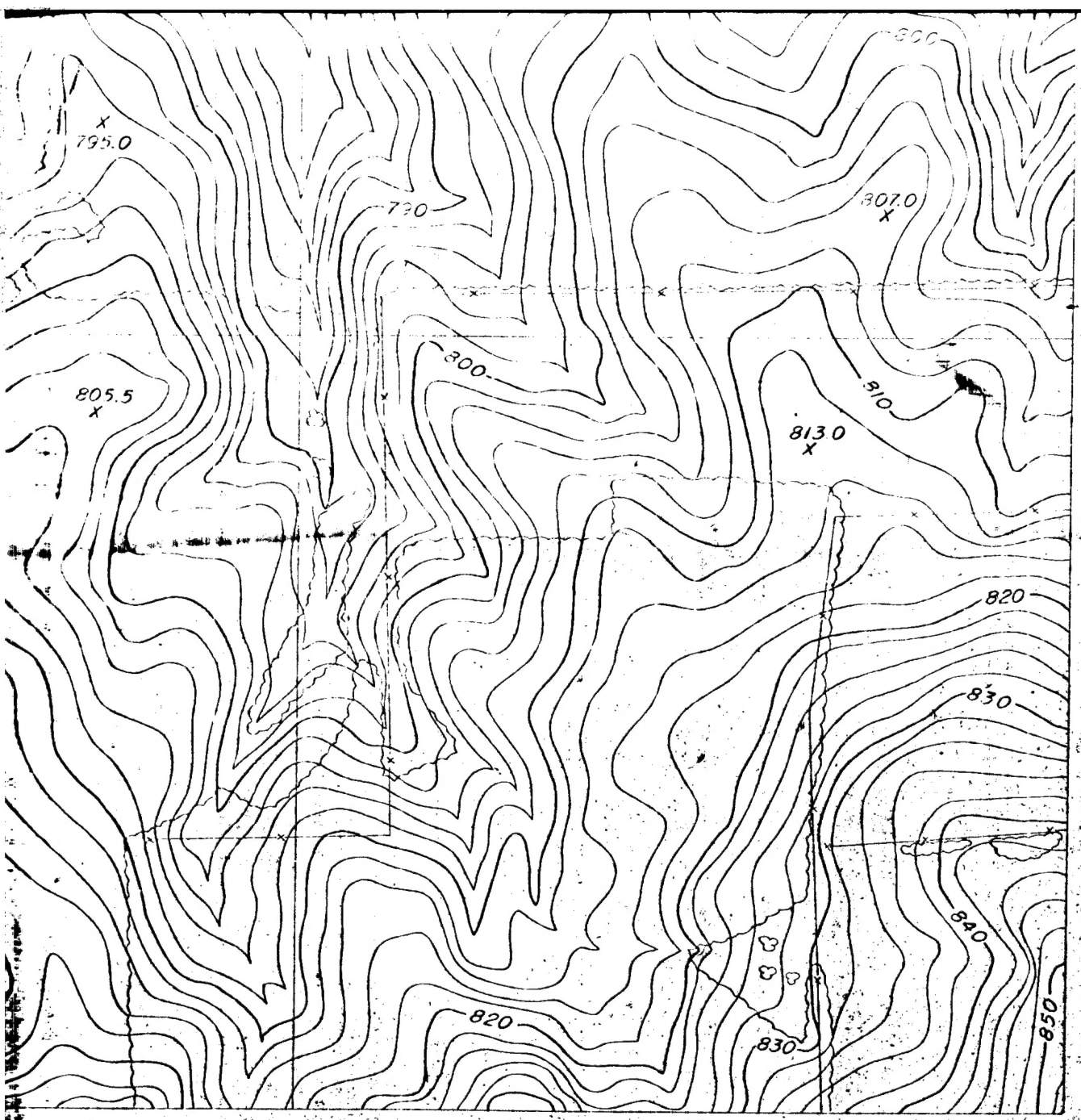
ROBERT B. FULTON,

JOHN D. HADDEN – HOWA

RED CREEK – RED MILL CREEK

FLOODED AREA MAP

VILLAGE OF PERRY, OHIO



LAKE COUNTY, OHIO

TOPOGRAPHIC MAPS

PREPARED FOR

BOARD OF LAKE COUNTY COMMISSIONERS

ROBERT B. FULTON, CHAIRMAN

JOHN D. HADDEN – HOWARD B. BEEBE

CREEK

OHIO